UNIVERSITY OF CALIFORNIA
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
BERKELEY, CALIFORNIA

SERIES ON CALIFORNIA CROPS AND PRICES

ORANGES

H. R. WELLMAN and E. W. BRAUN

BULLETIN 457

AUGUST, 1928

UNIVERSITY OF CALIFORNIA PRINTING OFFICE
BERKELEY, CALIFORNIA
1928

CONTENTS

ORANGES

H. R. WELLMAN[1] AND E. W. BRAUN[2]

SUMMARY

Practically the entire national supply of oranges is produced in two states, California and Florida. At the present time California contributes about two-thirds and Florida about one-third of this supply. Less than 1 per cent of the total commercial crop is produced in the other states of the Union. A small quantity of oranges is received from Porto Rico.

Both California and Florida have experienced a substantial increase in orange production during the past twenty years. Production in Florida, however, has increased relatively faster than in California. Between 1908–1912 and 1923–1927 the percentage increase in Florida production amounted to 150 per cent, in California to 67 per cent. The total increase in the United States production during this period amounted to 87 per cent.

Foreign markets have provided an outlet for only a small part of the increase in orange production; nearly 90 per cent of it has been consumed in this country. Our consumption of oranges has increased much faster than the population. From 1908 to 1912 the average annual per-capita consumption amounted to 35 oranges; during the past five years it has amounted to 51 oranges. This is an increase of 46 per cent.

It is particularly significant that the increase in the per-capita consumption of oranges has occurred without a corresponding decline in their relative prices. In fact the prices of oranges are higher as compared with the prices of other commodities now than they were before the war. People are not only eating more oranges but they are paying more for them. Many factors have contributed to this increase in the demand for oranges. Among the more important ones are improvement in quality of pack, wider distribution, extension of the marketing season, development of new outlets, extensive advertising, and the active participation of nutrition workers in advocating the wider use of oranges. Some of these factors have been the result of fortunate circumstances, others the result of wisely directed action on the part of the leaders in the industry; all have had a part in maintaining the orange industry in the relatively favorable position which it has occupied during recent years.

[1] Extension Specialist in Agricultural Economics.
[2] Extension Specialist in Agricultural Economics.

Beginning with the 1924–25 season, and including the 1927–28 season, California Navel orange growers have enjoyed four years of high prices. On the average the prices of Navel oranges were 125 per cent above the pre-war level. On the other hand, the prices of all commodities averaged only 55 per cent above their pre-war levels. This means that there has been a substantial increase in the purchasing power of Navel oranges. Navel orange growers can now buy more of other commodities with the money they receive for a box of their oranges than they could ten, fifteen, or twenty years ago. From the standpoint of purchasing power the last four years have been the most prosperous four-year period in twenty years, and probably the most prosperous in the history of the industry.

It does not appear likely, however, that the present high price level of Navel oranges can be maintained during the coming years. Florida oranges compete directly with California Navels in the consuming markets, and indications point to an enormous increase in orange production in Florida during the next few years.

The shipping season of California Navels is normally from November to May. This is also the period when the bulk of the Florida oranges are shipped. During the four months of November to February, Florida normally ships even more oranges than California. It is evident, therefore, that there are heavy supplies of Florida oranges on the markets during practically the entire Navel season. Because of this close competition the prices received for California Navels are materially affected by the size of the Florida crop.

The relatively high prices of Navel oranges during the past four years were largely a result of the low production in Florida. The crops of 1924–25 and 1925–26 were materially reduced as a result of neglect arising out of the real estate boom. The 1926–27 crop was injured by frost and hurricane, and the 1927–28 crop by frost and drought. It should not be assumed, however, that the factors which caused four successive low crops will continue. Under normal conditions, such as existed between 1919 and 1924, the yield per acre is well above that of the past four years. Hence we may reasonably expect that the future orange crops in Florida will be substantially larger. In addition to the resumption of normal yields per acre it is expected that the bearing acreage will be materially larger. Approximately 40 per cent of the total orange acreage in Florida in 1927 was not yet in bearing. As this acreage comes into bearing, production will be increased. Taking into consideration these two factors—the normal yield per acre and larger bearing acreage—it is entirely

possible for Florida to produce twice as many oranges within the next five years as was produced on the average during the past four years. This will mean a net increase of approximately 50 per cent in the national supply of oranges to be marketed between November and May.

There is also likely to be some increase in orange production in Texas. As yet Texas has not been an important factor in orange production, but she is likely to become one very shortly. Since the shipping season in Texas is during the winter months, this increase in production will add further to the competition of our Navels.

On the other hand the production of Navels in California is not likely to be much larger during the next few years than it is at present, but neither is it likely to be much smaller. The present non-bearing acreage is just about sufficient to offset the bearing acreage that will normally be taken out.

There is no immediate prospect that the probable increase in the supply of oranges to be marketed in competition with our Navels can be absorbed at the present high level of prices. There has been, it is true, a substantial increase in the demand for oranges during the winter and spring months, and we can probably expect a further increase in the future. But it is extremely doubtful if the demand can be increased as fast during the next five years as production is likely to increase. Consequently the prices of Navels are likely to average lower during the coming years.

The prices of California Valencias are not likely to be materially affected by the probable increase in Florida production except during April and May. The shipping season of Valencias in California normally begins in April and extends through October. After May both Florida oranges and California Navels are practically out of the market. During most of their season, therefore, Valencias have the orange market to themselves. There are, however, large quantities of other fresh fruits offered to consumers in competition with Valencia oranges, and the shipments of these fruits have increased substantially during recent years.

As compared with the pre-war conditions, California Valencia growers have been in a less favorable position than Navel growers. Between 1910 and 1920 the trend of purchasing power of Valencias was downward. The most important cause for that downward trend was the rapid increase in shipments, which rose from 2,400,000 boxes in 1912 to 7,300,000 boxes in 1920. Consumers would not buy this greatly increased quantity except at relatively lower prices. Since 1920 the rate of increase in Valencia shipments has not been nearly

so rapid as before. The demand has increased even faster than the shipments, although the latter reached the total of 12,140,000 boxes in 1927. Consequently the trend of purchasing power has been upward.

This recent upward trend in purchasing power should not be expected to continue, however. The shipments of Valencias will probably be considerably larger during the next few years, since approximately 14 per cent of the Valencia acreage in this state is not yet in bearing, and an even larger proportion has not reached the age of full bearing. In addition, there is likely to be a further increase in the supplies of other fresh fruits on the markets during the Valencia season. On the other hand, the present level of prices of midseason and late Valencia oranges in California can probably be maintained, provided plantings are not materially increased. The demand for Valencia oranges has increased steadily, and there are as yet no indications that the saturation point has been reached.

Approximately 8 per cent of the oranges produced in the United States during the past five years have been exported. Canada, which is our most important foreign market for oranges, took about 85 per cent of the total exports. Exports from the United States to Canada have increased steadily in the past, and we can probably expect a further increase in the future. But on account of the relatively small population, it is not likely that Canada will provide an outlet for more than a small part of our increase in production.

During the past two years we have secured a foothold in the British market. It is doubtful, however, if Great Britain or any of the other European countries will provide an outlet for greatly increased exports of oranges from the United States. The tendency is toward increasing competition in all of the European markets. Therefore, if the United States orange growers are going to compete successfully in those markets, they will have to ship only good quality oranges which are carefully graded and packed. Even then it must be expected that the foreign outlet for our oranges will be limited.

From the standpoint of the individual orange grower the possibility of obtaining increased returns in the future lies largely in more efficient production. New planting should be made only in localities having favorable climatic and soil conditions, and where high yields of good quality fruit can be obtained. From the standpoint of the industry much progress has already been made in developing new outlets, increasing demand, and improving the quality and pack. With increased production more effort along these lines will be needed.

ACREAGE

United States Acreage of Oranges.—The estimated bearing acreage of oranges in the several orange-producing states of the Union since 1919 is shown in table 1. Between 1919 and 1924 the total bearing acreage of oranges in the United States increased approximately 44 per cent. Since 1924 there has been a further substantial increase. In 1924, which is the last year that estimates of acreage in all of the states are available, there were 290,000 acres of oranges in bearing in this country. Of this amount 61 per cent was in California and 36 per cent in Florida.

TABLE 1

Estimated Bearing Acreage of Oranges by States, 1919–1928

Year	California	Florida	Texas	Alabama	Louisiana	Arizona	Mississippi
	acres	*acres*	*acres*	*acres*	*acres*	*acres*	*acres*
1919	145,000	52,600	200	2,000	1,000	600	230
1920	162,000	57,500	.....	4,700	1,100	700	250
1921	171,928	64,600	.....	5,100	1,200	700	250
1922	175,415	73,200	.....	11,500	1,300	800	400
1923	176,820	86,100	2,100	13,100	1,400	900	450
1924	177,978	104,400	2,400	2,100	1,400	1,000	300*
1925	181,341	108,600	2,700	2,300	1,500	.....	300
1926	184,060	122,100	.....	.....	1,600	.....	400
1927	185,543	128,200	.....	.....	.....	.....	.....
1928	187,281	.....	.....	.....	.....	.....	.....

* 1924 data for Mississippi, writers' estimate.

Sources of data:

California from California Cooperative Crop Reporting Service (revised figures).

Other states from U. S. Dept. Agr. Bur. Agr. Econ. Market prospects for citrus fruits, 1927–28, *p. 2*, 1927 (mimeo.); except as follows: 1927 data for Florida from Nathan Mayo, Commissioner of Agriculture, Florida, in letter dated Feb. 11, 1928.

All data except for California given in number of trees. Number of trees per acre in various states as estimated by Prof. Robert W. Hodgson, Division of Subtropical Horticulture, University of California, are as follows: Florida and Texas, 70; Arizona, 75; Louisiana, 100; Alabama and Mississippi, 130.

Data not available where omitted.

In California estimates of bearing acreage are available for each year since 1914. These data are shown graphically in figure 1. It will be noted that the period of greatest expansion in the orange industry in this state during the past fifteen years occurred between 1916 and 1921. During these five years the bearing acreage was increased by 58,200 acres, or 51 per cent. Since 1921 the bearing acreage has increased steadily but more slowly than before. At the present time the bearing acreage amounts to 187,281 acres, 15,353 acres more than in 1921, an increase of 9 per cent.

In the five most important orange-producing counties in California, which together contain 91 per cent of the total bearing acreage in the state, there are 84,590 acres of Navels, 83,825 acres of Valencias, and 2,537 acres of miscellaneous varieties (table 2).

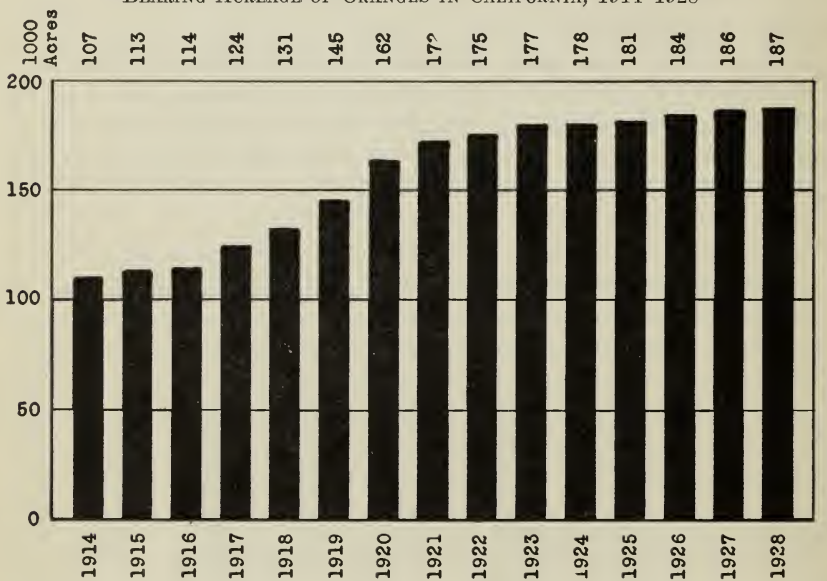


Fig. 1.—There has been a substantial and continuous growth in the orange industry in California during the past fourteen years.
(Data from the California Cooperative Crop Reporting Service.)

TABLE 2

Estimated Acreage of Oranges by Varieties in Five Counties in California, 1928

County	Bearing acres				Non-bearing acres*				Total bearing and non-bearing
	Navels	Valencias	Miscellaneous	Total	Navels	Valencias	Miscellaneous	Total	
Los Angeles	16,054	23,700	673	40,427	549	2,699	8	3,256	43,683
Orange	982	37,938	83	39,003	9	10,046	.....	10,055	49,058
Riverside	12,093	3,182	489	15,764	222	50	.....	272	16,036
San Bernardino	29,196	9,433	823	39,452	411	248	.....	659	40,111
Tulare	26,265	9,572	469	36,306	192	24	52	268	36,574
Total five counties	84,590	83,825	2,537	170,952	1,383	13,067	60	14,510	185,462

* 1927 plantings are not included.

Source of data: Compiled by N. I. Nielsen, Fruit Statistician, California Cooperative Crop Reporting Service.

The present non-bearing acreage of oranges in California, including 3,197 acres planted in 1927, amounts to 22,519 acres. This indicates that there will be a further increase in bearing acreage during the next few years. The largest proportion of this increase will be Valencias. Of the 14,510 acres, exclusive of 1927 planting, not in bearing in the five most important orange-producing counties in the state, 90 per cent were Valencias and only 10 per cent Navels.

The orange industry in Florida has experienced a phenomenal expansion during the past decade. Between 1919 and 1927 the increase in the bearing acreage amounted to 75,600 acres, or 143 per cent. In 1927 the total orange acreage in Florida amounted to 208,476 acres, which is only 336 acres less than the total orange acreage in California at the present time. Of the 208,476 acres in Florida in 1927, 80,246 acres, or 38.5 per cent, were not yet in bearing. It is probable, therefore, that there will be a very large increase in bearing acreage in Florida during the next few years.

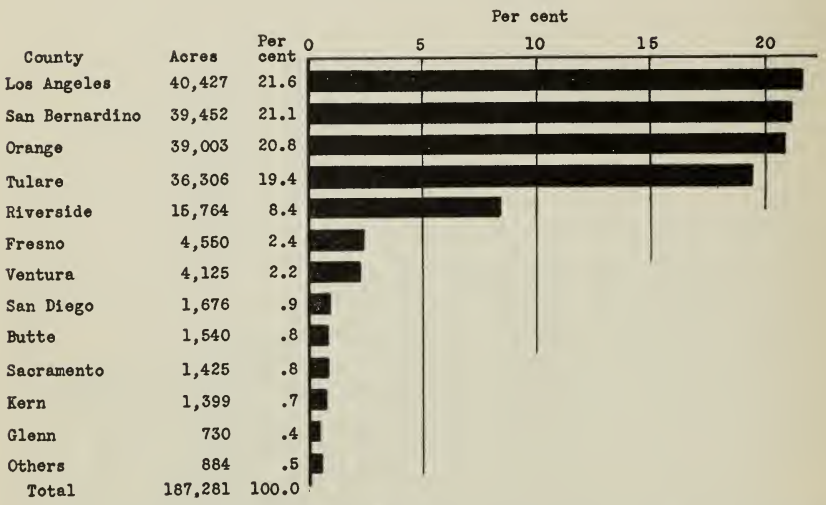
Within the past five years there has been considerable activity in the planting of oranges in Texas. According to the Bureau of Agricultural Economics of the United States Department of Agriculture, there were over 17,000 acres of oranges in the Lower Rio Grande Valley in 1927, of which less than one-third were considered in bearing.[3] In the Laredo—Winter-Garden—Pearsall section there are approximately 1,200 acres, practically all of which has been planted in the last three years.

Orange Acreage by Counties in California.—The production of oranges in California is not widely distributed throughout the state. Although oranges are grown on a commercial basis in twenty-three of the fifty-eight counties, the large producing areas are confined to a comparatively few counties. The main orange-producing counties are Orange, Los Angeles, San Bernardino, Riverside, Ventura, and San Diego in southern California; Tulare, Fresno, and Kern in central California; and Butte, Sacramento, and Glenn in northern California.

The relative importance of the main orange-producing counties from the standpoint of bearing acreage is shown in figure 2. The five counties of Los Angeles, San Bernardino, Orange, Tulare, and Riverside contain over 90 per cent of the total bearing acreage in the state.

[3] U. S. Dept. Agr. Bur. Agr. Econ. Market prospects for citrus fruits 1927–28. pp. 8–9. Dec. 6, 1927 (mimeo.).

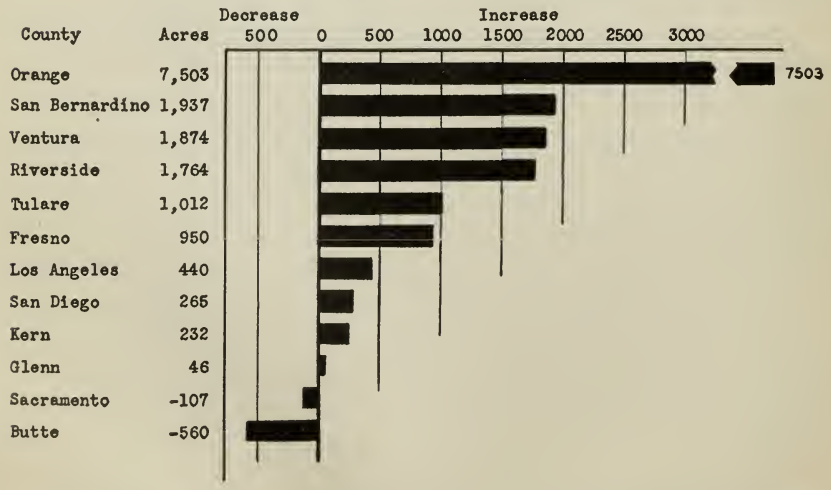
PERCENTAGE OF CALIFORNIA'S BEARING ORANGE ACREAGE IN MAIN ORANGE-PRODUCING COUNTIES, 1928



County	Acres	Per cent
Los Angeles	40,427	21.6
San Bernardino	39,452	21.1
Orange	39,003	20.8
Tulare	36,306	19.4
Riverside	15,764	8.4
Fresno	4,550	2.4
Ventura	4,125	2.2
San Diego	1,676	.9
Butte	1,540	.8
Sacramento	1,425	.8
Kern	1,399	.7
Glenn	730	.4
Others	884	.5
Total	187,281	100.0

Fig. 2.—Approximately 83 per cent of the bearing orange acreage in California is in the four counties of Los Angeles, San Bernardino, Orange, and Tulare.
(Data from table 21.)

ABSOLUTE INCREASE OR DECREASE IN BEARING ACREAGE OF ORANGES IN MAIN ORANGE-PRODUCING COUNTIES IN CALIFORNIA FROM 1921 TO 1928



County	Acres
Orange	7,503
San Bernardino	1,937
Ventura	1,874
Riverside	1,764
Tulare	1,012
Fresno	950
Los Angeles	440
San Diego	265
Kern	232
Glenn	46
Sacramento	-107
Butte	-560

Fig. 3.—Almost one-half of the total increase in bearing acreage since 1921 has occurred in Orange County.
(Data compiled from table 21.)

Figure 3 shows the absolute changes in bearing acreage between 1921 and 1928 in the twelve most important orange-producing counties. Ten of the twelve counties show an increase, two a decrease. The increase in bearing acreage in Orange County has been very large, amounting to 7,503 acres, which is almost one-half of the total increase in the state. In Ventura County almost as many bearing acres of oranges have been added since 1921 as in San Bernardino County, and the percentage increase has been very much greater. Of all the important orange-producing counties, Ventura has experienced the largest percentage increase in bearing acreage during the past seven years. In Riverside County the peak in bearing acres was reached in 1926; and during the past two years there has been a decrease of over 1,400 acres. The two principal orange-producing counties in northern California, Butte and Sacramento, show a loss of 560 and 107 acres respectively between 1921 and 1928.

PERCENTAGE OF CALIFORNIA'S NON-BEARING ORANGE ACREAGE IN MAIN ORANGE-PRODUCING COUNTIES, 1928

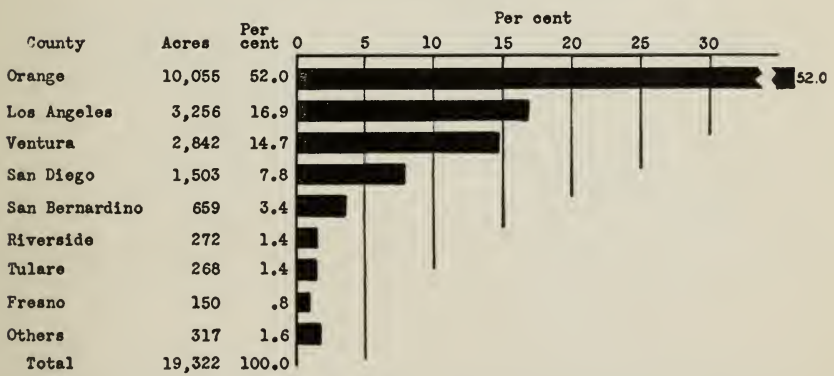


Fig. 4.—During recent years large plantings of oranges have been made in Orange, Los Angeles, and Ventura counties.
(Data from table 21.)

Figure 4, which gives the non-bearing acreage by counties in 1928, shows the location of recent plantings of oranges. Of the 19,322 acres of oranges not in bearing in California, exclusive of 1927 plantings, 10,055 acres were in Orange County, 3,256 acres in Los Angeles County, and 2,842 acres in Ventura County. These three counties contained 83.6 per cent of the total non-bearing acreage in the state, and Orange County alone contained 52 per cent of the total.

PRODUCTION

Commercial Production of Oranges, United States.—The average commercial production of oranges in the United States during the past five years has amounted to 31,756,000 boxes. Of this amount California contributed 67 per cent and Florida 32 per cent. The production in California, therefore, was approximately twice as large as that in Florida. Some of the other states, principally Alabama, Arizona, Louisiana, Mississippi, and Texas also produce oranges on a commercial basis. The amount produced in each of these states, however, is relatively small. Their combined production during these five years amounted to only 163,000 boxes on the average, which was less than 1 per cent of the total United States production.

ESTIMATED COMMERCIAL PRODUCTION OF ORANGES, UNITED STATES, 1908–1927

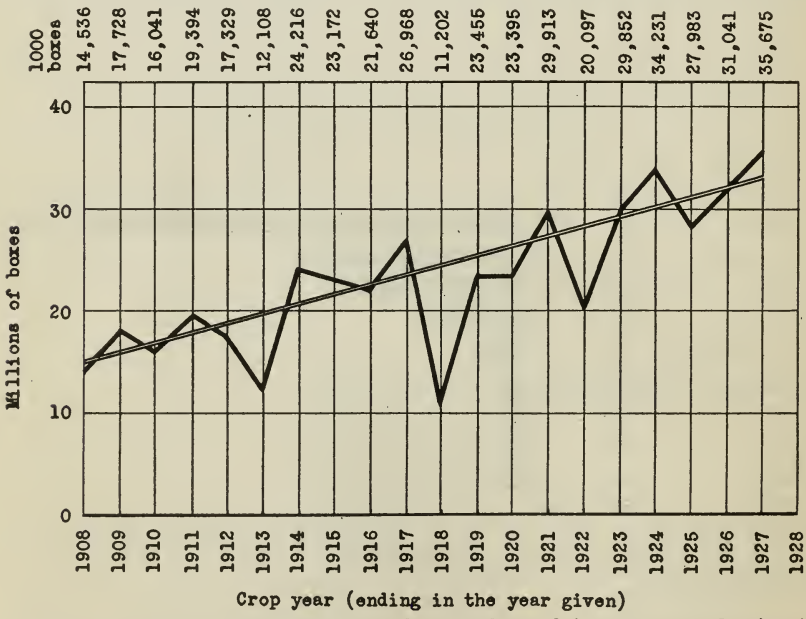


Fig. 5.—There has been a pronounced upward trend in orange production in the United States since 1908. (Data from table 22.)

The changes in the United States orange production between 1908 and 1927[4] are shown in figure 5. During this period there was a

[4] Unless otherwise noted, crop years are used rather than calendar years for data pertaining to the United States. In California the crop year begins in November and extends through October of the following year, and in Florida it begins about the first of October and usually extends into June. Where a single date is used to designate a crop year, it is the one in which the crop year ends; for example, the period 1923–1927 refers to the crop years from 1922–23 to 1926–27.

pronounced upward trend in production, which is indicated by the hollow line. The average production during the first five years of this twenty-year period amounted to 17,006,000 boxes, whereas the average production during the last five years amounted to 31,756,000 boxes. This is an increase of 14,750,000 boxes, or 87 per cent. During the same time the population of the United States increased only 25 per cent.

Relative Changes in the Commercial Production of Oranges in California and Florida, 1908–1927

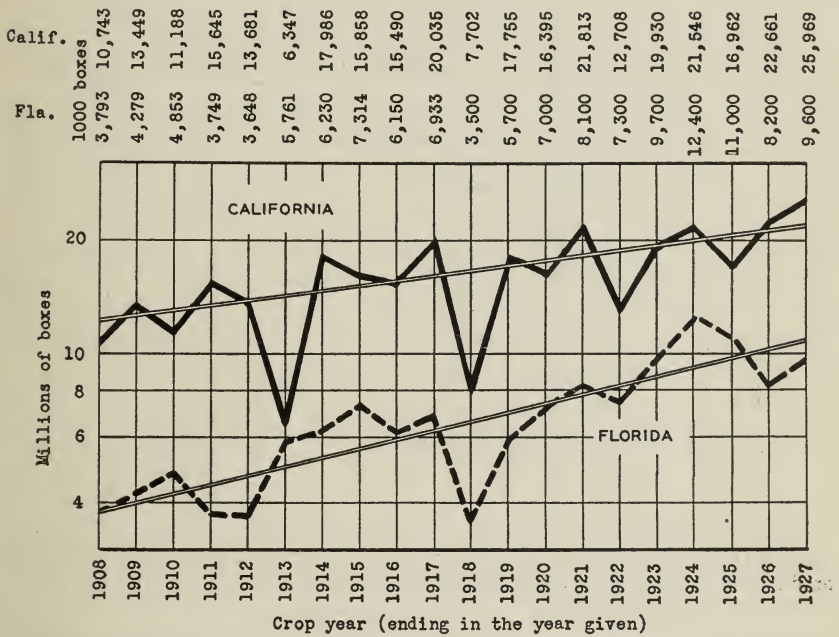


Fig. 6.—Both California and Florida have experienced a substantial increase in orange production during the past twenty years. The percentage increase in Florida, however, has been over twice as large as in California.
(Data from table 22.)

Orange Production in California and Florida.—Of the total increase of 14,750,000 boxes in the national orange crop between 1908–1912 and 1923–1927 California contributed 8,473,000 boxes, or 57 per cent, and Florida 6,116,000 boxes, or 42 per cent. California, therefore, was responsible for a larger proportion of the total increase than Florida.

Although the absolute increase in orange production during the past twenty years was less in Florida than in California, the percentage increase was greater. This is accounted for by the fact that

the total production at the beginning of the period was considerably larger in California than in Florida. A comparison of the percentage changes in the orange production of the two states between 1908 and 1927 is shown in figure 6. It will be noted that both states have experienced a rapid increase in production. In Florida, however, production has increased at an even faster rate than in California.

COMMERCIAL PRODUCTION AND BEARING ACREAGE OF ORANGES IN FLORIDA, 1919–20 TO 1926–27, AND FORECAST OF TREND OF BEARING ACREAGE, 1928–29 TO 1932–33

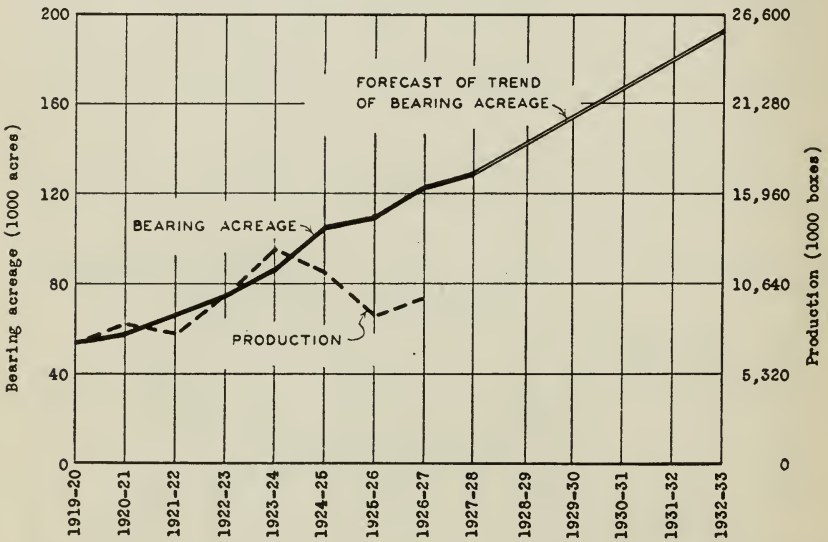


Fig. 7.—The bearing acreage of oranges in Florida is likely to increase substantially during the next five years. With favorable climatic conditions production will probably be very much larger than it was this past year.
(Data from tables 1 and 22.)

Between 1908–1912 and 1923–1927 the percentage increase in production in Florida amounted to 150 per cent, and in California to 65 per cent. It is evident that Florida has become an increasingly important competitor of California. During the five years from 1908 to 1912, Florida contributed only 24 per cent of the total United States production; now Florida contributes 32 per cent.

Probable Future Production.—The trends of production in both California and Florida are likely to continue upward during the next few years. It has already been pointed out that some increase in bearing acreage in California may be expected. In addition there may be some increase in the average yield per acre, since a considerable proportion of the trees have not yet reached the age of full bearing.

Indications point to an enormous increase in orange production in Florida during the next few years. Figure 7 was prepared to help visualize the amount of this probable increase. The solid line in figure 7 represents the bearing acreage in Florida between 1919 and 1927. The extension of this line represents the probable trend of bearing acreage during the next five years. This forecast is based upon the non-bearing acreage in 1927, which amounted to approximately 80,000 acres. An orange tree in Florida comes into bearing in five years. By 1932, therefore, even the youngest of the present non-bearing trees will be in bearing. This does not mean, of course, that there will be a net increase of 80,000 acres in the bearing acreage by 1932. Some of the present non-bearing acreage may not reach the age of bearing, and in addition some of the bearing acreage will probably be taken out. To take care of this mortality, an allowance of 20 per cent of the present non-bearing acreage was made. This leaves a net increase in bearing acreage of 64,000 acres during the next five years.

The production of oranges in Florida is represented by the broken line. The scale of production is adjusted to that of bearing acreage on the basis of the average yield per acre between 1920 and 1924. Conditions in Florida with respect to yield per acre appear to have been normal during these five years. During this period the curves of bearing acreage and production moved closely together, with the curve of production fluctuating above and below the curve of bearing acreage. This is exactly the situation that we would expect under normal conditions.

Conditions during the four years from 1924–25 to 1927–28, however, have been considerably below normal. Consequently production has not kept pace with the rapid increase in bearing acreage. The small crops of 1924–25 and 1925–26 were largely the result of neglect arising out of the recent real-estate boom. During the boom large acreages of oranges were sub-divided. They were not properly cared for and in particular no fertilizer was applied. Consequently the yields were greatly reduced. The small crop in 1926–27 was the result of a combination of events: a severe freeze, a hurricane, and a drought. The 1927–28 crop was also small. The drought which affected the 1926–27 crop continued. In addition there was another severe freeze in Florida the latter part of 1927.

The factors which caused four successive low crops cannot normally be expected to continue, however. The real-estate boom has subsided, and the neglected orchards have been largely brought back into production. The freezes in 1927 were the most severe since 1917,

and the drought was the most severe that has occurred in a half century. It seems reasonable to believe, therefore, that conditions in Florida will be much more favorable for orange production during the next few years than they have in the past four years. With favorable conditions it is likely that the production of oranges will again resume a position with respect to bearing acreage similar to that which it occupied between 1920 and 1924.

Fluctuations in Production from Year to Year.—Orange production fluctuates widely from year to year. The fluctuations are caused in the main by variations in climatic conditions. The principal climatic factors which affect the yield of oranges are frost, wind, and heat. The influence of the first two of these three factors can be partially controlled: frost damage by orchard heating; and wind damage by the planting of windbreaks. Protection against heat, however, cannot be economically secured. Fortunately, periods of extreme heat are exceedingly rare.

The direction and extent of the fluctuations in orange production in California and Florida are shown in figure 6. It will be noted that the fluctuations in the two states are generally, although not always, in the same direction. The tendency for large and small crops to occur at the same time in the two states is probably due largely to coincidence. Nevertheless, it has had an important effect upon the marketing of oranges in that it has accentuated rather than diminished the fluctuations in the total United States production.

The extent of the fluctuations in production in the two states during the past twenty years has been about equal on the average. Each state has experienced a number of disastrous seasons. In California the crops of 1913 and 1922 were severely damaged by frost, and the 1918 crop by heat. In Florida severe freezes occurred in 1911, 1917, and 1927.

California Shipments by Varieties.—The Navel and Valencia are the principal varieties of oranges grown in California. Approximately 98 per cent of the total orange shipments at the present time are of these two varieties. The remaining 2 per cent of the shipments are made up of a number of miscellaneous varieties such as Mediterranean Sweets, Bloods, St. Michaels, Seedlings, and Tangerines.

The annual shipments of Navels and Valencias for the past sixteen years are shown in figure 8, Navel shipments being represented by the solid line and Valencia shipments by the broken line. It is at once apparent that Valencia shipments have increased very much faster than Navel shipments, both absolutely and relatively. Between the

two 3-year periods of 1912–14 and 1925–27 the increase in Valencia shipments amounted to 7,053,000 boxes, or 249 per cent; whereas the increase in Navel shipments amounted to only 1,527,000 boxes, or 17 per cent. Of the total increase in orange shipments between these two periods 82 per cent were Valencias and only 18 per cent were Navels.

Shipments of Navel and Valencia Oranges, California, 1912–1927

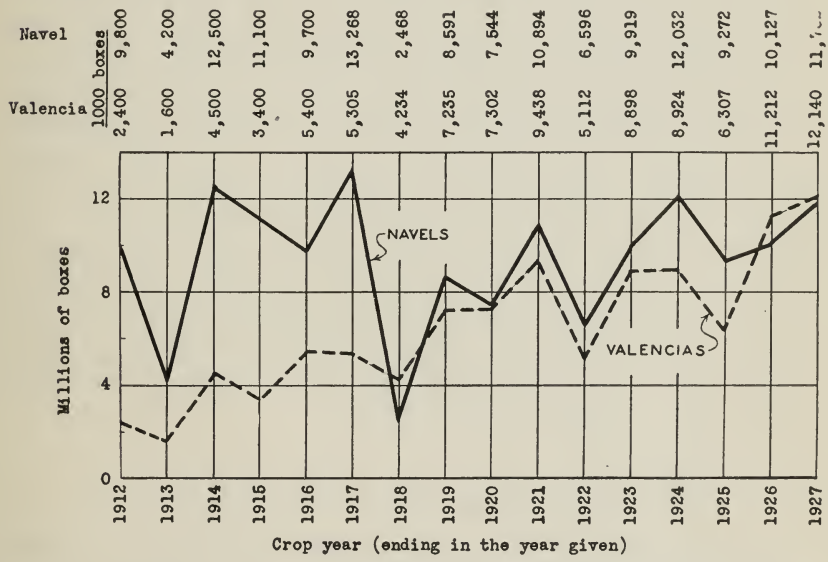


Fig. 8.—During the past sixteen years Valencia shipments have increased greatly; Navel shipments, only slightly.

(Data for years 1917–1927 from California Fruit Growers Exchange; years 1912–1916 estimates by the writers.)

Before 1918 the Navel was the predominant variety of oranges grown in California. Between 1912 and 1917 the average annual shipments of Navels were 2.7 times as large as those of Valencias. In 1918, however, the Navel crop was greatly reduced, principally because of the unprecedented period of extreme heat in June, 1917. As a result the shipments of Navels fell below those of Valencias. This situation was, of course, only temporary. For each of the following seven years the Navel shipments were again the larger of the two, although the difference between them was not as great as before 1918. But during the past two years Valencias have been more important than Navels, and this situation is of a permanent nature as contrasted with the temporary situation in 1918.

It is also likely that the bulk of the increase in orange production during the next few years will be Valencias. Approximately 90 per cent of the present non-bearing acreage of oranges in the state are Valencias and only 10 per cent are Navels. The peak of Navel production in California seems to have been reached.

It will be noted in figure 8 that the total yearly shipments of California Navels and Valencias have tended to fluctuate in the same direction. The reason for this situation is that the climatic conditions throughout most of the orange-producing areas south of the Tehachapi are generally similar. Although the main producing districts of Navels and Valencias are fairly distinct, they are not widely separated. In addition a considerable portion of the two varieties are produced in the same districts. The production north of the Tehachapi, which is largely Navels, is relatively small, and, therefore, does not exert a pronounced effect upon the direction of the fluctuation in the total shipments. It sometimes happens, of course, that the shipments of Navels and Valencias fluctuate in opposite directions. For example, in 1916 and 1920 there was an increase in Valencia shipments and a decrease in Navel shipments. The decline in Navel shipments in these two years was chiefly due to June drop, which is usually a more serious problem with Navels than with Valencias.

SEASONAL MOVEMENT OF ORANGE SHIPMENTS

Seasonal Variation in Total Shipments, United States.—Oranges are an all-year-round product. Carlot shipments of oranges in considerable numbers reach the consuming markets every month of the year. The heaviest shipments, however, occur during the winter and early spring months (fig. 9). On the average, two-thirds of the United States orange crop is shipped during the six months from November to April. December is usually the month of heaviest shipments. From May to July shipments decline rapidly and remain at a relatively low point during August, September, and October.

The percentage of the total crop shipped each month varies, of course, from year to year. The greatest variation is usually in November, which is largely accounted for by early and late seasons. When the season is early a larger proportion of the crop is shipped in November than when it is late. After November the proportion shipped during each of the remaining months is remarkably uniform from year to year, as illustrated by the close correspondence between the five-year-average curve and the 1926–27 curve in figure 9.

Seasonal Variation in California and Florida Shipments.—Figure 10 shows the average monthly carlot shipments of oranges from California and Florida. The chief difference between the seasonal movement of oranges from these two states is at once apparent. California ships oranges every month in the year. Florida ships oranges during only a part of the year. The new-crop Florida oranges start to market in October, the month which practically marks the end of the

Percentage of Total Carlot Shipments of United States Oranges Shipped by Months, 1926–27, and Average, 1922–23 to 1926–27

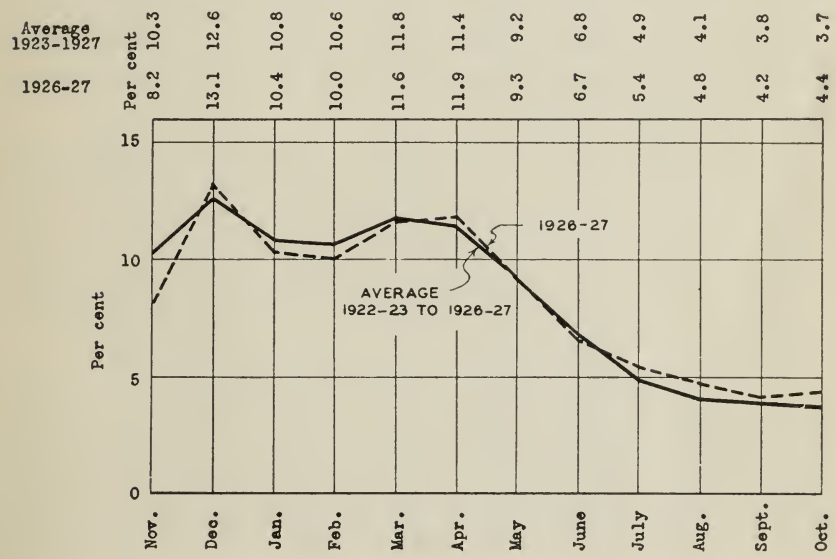


Fig. 9.—Oranges move to market every month in the year. The heaviest shipments, however, are during the winter and spring months.
(Data compiled from table 24.)

California Valencia season. During the next two months, shipments from Florida increase rapidly. The peak of shipments is usually in December. Approximately 20 per cent of the crop is shipped during that one month. January and February are likewise months of heavy shipments, although somewhat smaller than December. During each of the four months of November to February, Florida normally ships more oranges than California. By the end of February approximately 70 per cent of the Florida crop has been shipped. From March on, shipments decline rapidly, and by June they are practically negligible. In the future, shipments in February, March, and April may be larger as compared with the other months than they are now,

because the bulk of the recent plantings in Florida are Valencias, which mature late in the season.

Shipments of new-crop California oranges begin in November and continue actively throughout the year. The heaviest shipping period is during the four months of March to June, when approximately 55 per cent of the total orange crop in the state moves to market. April is usually the month of heaviest shipments, with May a close second. After May shipments decline, reaching a low point in October. The tendency has been for the movement of oranges from this state to become more uniform throughout the season because of the rapid increase in Valencia production. And since a large part of the present non-bearing orange acreage in the state is Valencias, it is likely that the seasonal movement will become even more uniform during the next few years than it is now.

The fact that California oranges are shipped to market every month of the year is of great value to the industry. It enables the consumption of oranges to be spread out over a long period. If all of the oranges produced in this state had to be consumed within five or six months, the returns would undoubtedly be much lower. Again, a continuous supply of oranges enables the sales organizations to operate more efficiently.

An orange-shipping season which extends throughout the entire year is made possible in California by a number of conditions: (1) Oranges are grown in different climatic zones in which the normal season of maturity is different. (2) The two most important varieties of oranges grown in California mature at different periods of the year. Navels mature early, Valencias late. Furthermore, both varieties are grown in each of the climatic zones. This gives a succession of ripening periods throughout the year. (3) After oranges are mature, they can generally be held on the trees for a considerable period. This makes it possible to distribute them more evenly between the normal periods of ripening of the two varieties.

According to Professor Robert W. Hodgson, Division of Subtropical Horticulture, University of California, the chief reason why the shipping season in Florida is so much shorter than in California is that the oranges in the several producing districts in Florida mature at about the same time. Florida does not have such distinct climatic zones as exist in California. There is seldom over two or three weeks difference in the time of maturity between the earliest and the latest district in Florida. The other main factors which affect the length of the shipping season are somewhat similar in the

two states. Florida has early and late varieties, although their ripening periods are not as far apart as in California. And, with the exception of the Pineapple variety, oranges can be held on the trees nearly as long in Florida as they can in any given district in California.

Monthly Carlot Shipments of Oranges, California and Florida, Average 1922–23 to 1926–27

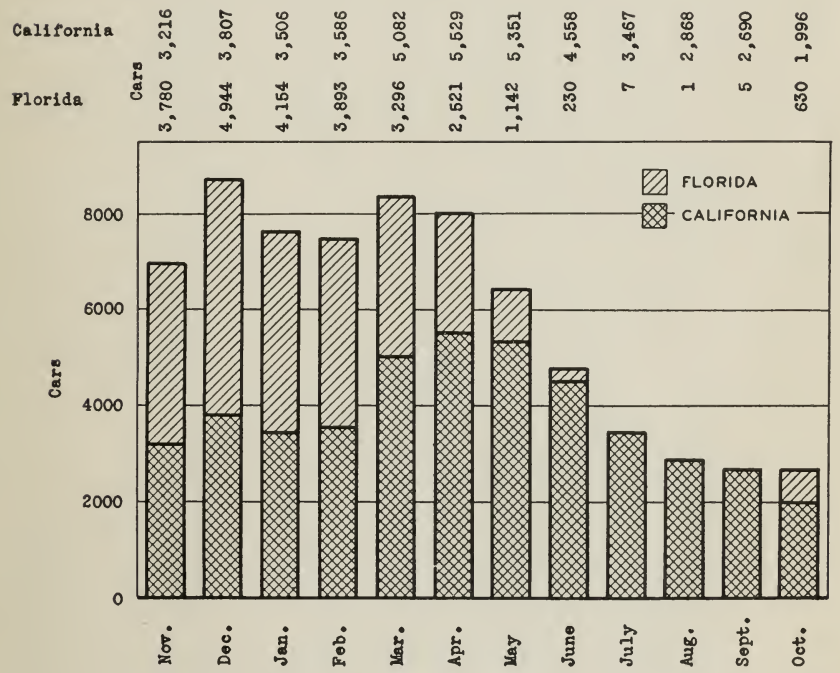


Fig. 10.—Florida oranges compete most severely with California oranges during the five months of November to March.

(Data compiled from table 24.)

Seasonal Variation in Navel and Valencia Shipments.—The average monthly shipments of Navel and Valencia oranges from California are shown in figure 11. The shipping periods of these two varieties are fairly distinct. They largely supplement each other rather than compete with each other. Thus during the period from November to March, when the shipments of Navels are heaviest, practically no Valencias are shipped. And as Valencia shipments increase, Navel shipments decline. By the time Valencia shipments have reached the peak, the entire Navel crop is gone. It is only during April and May

that Navels and Valencias compete to any considerable extent with each other in the consuming market.

By referring to figures 10 and 11 it will be seen that Florida oranges compete most severely with California Navels. Heavy shipments of Florida oranges reach the markets during practically the entire Navel season. Since orange production in Florida has been increasing rapidly the California Navel grower has been subjected to keener and keener competition. Furthermore, it is likely that this competition will continue to increase for some time.

MONTHLY SHIPMENTS OF NAVEL AND VALENCIA ORANGES, CALIFORNIA, AVERAGE 1923–24 TO 1926–27

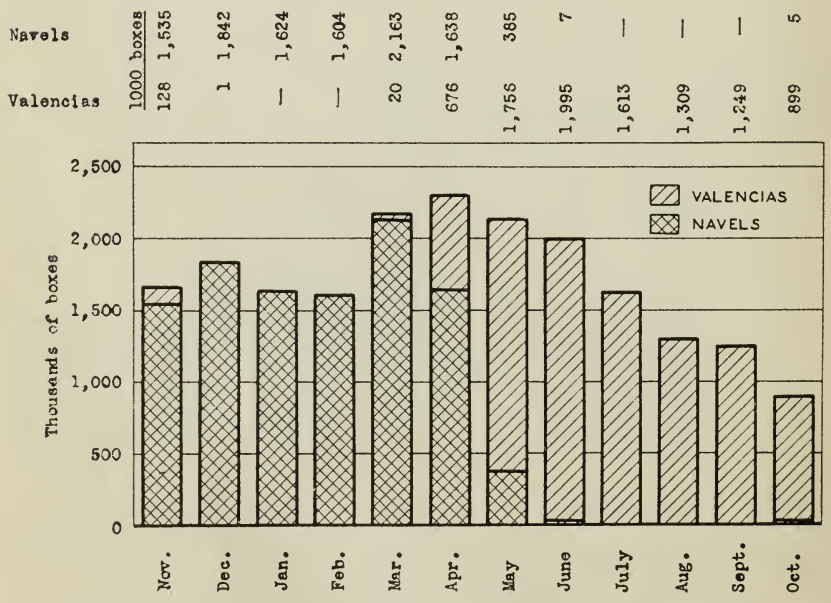


Fig. 11.—California Navel and Valencia oranges do not compete seriously with each other. Navels, however, meet with keen competition from Florida oranges; while Valencias meet with keen competition from other fresh fruits.

(Data compiled from records of the California Fruit Growers Exchange.)

California Valencias, on the other hand, practically have the orange market to themselves. During the peak of the Valencia season both Florida oranges and California Navels are out of the market. There are, however, large quantities of fresh fruits available on the market during the entire Valencia season.

TABLE 3

Monthly Carlot Shipments of Certain Fresh Fruits, United States, Average 1923–1927

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	cars	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*
Oranges	7,645	7,460	8,335	8,025	6,471	4,791	3,477	2,860	2,683	2,654	7,257	8,876	70,534
Grapefruits	2,647	2,585	2,846	2,442	1,719	405	206	69	173	1,421	2,577	1,860	18,950
Lemons	749	657	1,021	1,180	1,884	1,902	1,435	993	611	670	521	619	12,242
Strawberries	77	239	418	2,378	8,918	3,621	293	.....	.....	.....	.....	.....	15,944
Cantaloupes	.....	.....	.....	.....	2,228	9,977	8,135	5,353	2,395	141	.....	.....	28,229
Peaches	.....	.....	.....	.....	.....	3,366	13,014	9,742	6,130	.....	.....	.....	32,252
Plums and prunes*	.....	.....	.....	.....	.....	1,479	2,751	3,556	2,781	593	106	31	12,278
Pears	151	139	83	.....	.....	.....	3,864	6,324	5,599	2,807	502	176	19,645
Bananas	6,629	5,758	8,807	10,666	11,744	12,833	11,256	10,875	8,969	9,078	7,766	7,033	111,414
Table grapes†	.....	.....	.....	.....	.....	.....	1,400	3,000	3,800	4,200	.....	.....	12,400

* Includes mixed deciduous. † 1926 only.

Sources of data: U. S. Department Agr. Bur. Agr. Econ. Crops and Markets, except as follows: Peach shipments have been corrected for dried and canned outputs in California. Banana shipments are net imports converted to cars on the basis of 450 bunches per car. The import figures are from U. S. Dept. Commerce, Monthly Summary of Foreign Commerce of the United States, monthly issues. Table grape shipments are from Shear S. W. and H. F. Gould. Economic status of the grape industry. California Agr. Exp. Sta. Bul. **429**: 70. 1927. These data are estimated shipments of grapes as table stock from California in 1926.

MONTHLY CARLOT SHIPMENTS OF CERTAIN FRESH FRUITS, UNITED STATES, AVERAGE 1923–1927

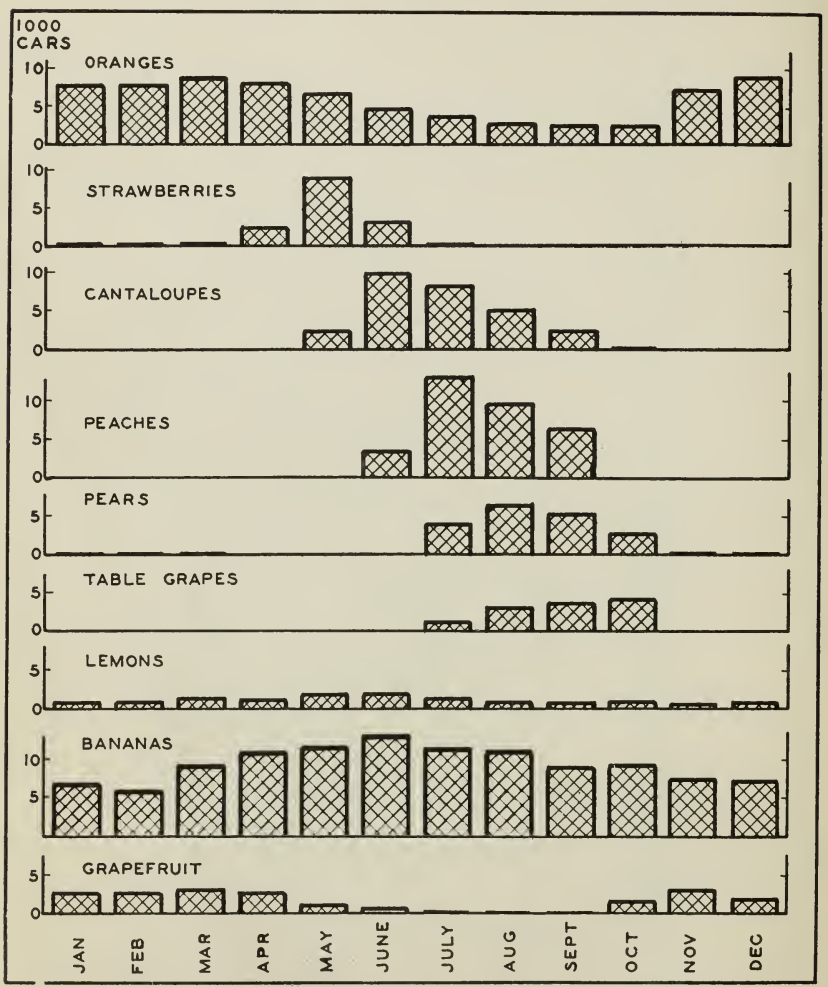


Fig. 12.—Most of the fresh fruits are marketed during the summer and fall months. Thus they compete more severely with Valencia oranges than with Navel oranges.

(Data from table 3.)

Seasonal Movement of Other Fresh Fruits.—Figure 12 shows the shipping seasons of a number of the important fresh fruits which compete with oranges in the consuming markets. It will be noted that the bulk of them come on the market at the same time as Valencia oranges. Strawberry shipments are heaviest in May, cantaloupe ship-

ments in June and July, peach shipments in July and August, pear shipments in August and September, and table-grape shipments in September and October. Apples, lemons, and bananas are also important competitors of Valencia oranges. In the summer, early apples such as Gravensteins are available, and in the fall the main apple crop is harvested.[5] The principal competition between lemons and oranges is in the preparation of soft drinks, which are used most extensively during the summer months. Although lemon shipments continue actively throughout the year, the heaviest shipping period is during May, June, and July. These are also the months of largest lemon imports. The imports of bananas are also heaviest during the Valencia season. During the past three years 59 per cent of the total annual imports have come in between May and October as against 41 per cent between November and April.

TABLE 4

Annual Carlot Shipments of Certain Fresh Fruits in the United States, Average 1920–1921 and 1926–1927

	Average 1920–1921	Average 1926–1927	Increase from 1920–1921 to 1926–1927	
	cars	*cars*	*cars*	*per cent*
Apples	103,635	115,482	11,847	11.4
Bananas	87,783	123,610	35,827	40.8
Peaches	23,215	36,750	13,535	58.3
Cantaloupes	24,384	28,934	4,550	18.7
Strawberries	9,032	15,474	6,442	71.3
Lemons	10,803	13,413	2,610	24.2
Grapefruit	11,839	17,701	5,862	49.5
Plums and prunes	5,383	6,484	1,101	20.5
Pears	14,540	21,359	6,819	46.9
Total	290,614	379,207	88,593	30.5

Sources of data: U. S. Dept. Agr. Bur. Agr. Econ. Crops and Markets, except as follows: Peach shipments have been corrected for dried and canned outputs in California. Banana shipments are net imports converted to cars on the basis of 450 bunches per car. The import figures are from U. S. Dept. Commerce, Monthly Summary of Foreign Commerce of the United States, monthly issues.

California Navel oranges do not entirely escape from the competition of other fresh fruits. Large quantities of storage apples are available during the winter and spring months. It is probable that apples compete even more with Navel than with Valencia oranges. The imports of bananas during the Navel season, while not as large as during the Valencia season, are of sufficient volume to affect the

[5] The monthly shipments of apples are not shown in figure 12 because they do not represent the movement into consumption, since a large part of the crop is stored.

TABLE 5

Monthly Carlot Shipments of Oranges by Districts and Counties, California

Average 1921–22 to 1925–26

Districts and counties	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
	cars	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*
Southern district:													
Los Angeles	60	91	993	1,103	1,668	1,258	948	1,071	891	707	653	448	9,891
Orange	255	90	337	119	124	408	1,323	1,698	1,480	1,304	1,214	1,030	9,382
Riverside	46	298	595	656	916	784	444	269	111	51	45	29	4,244
San Bernardino	80	413	1,065	1,127	1,704	1,478	876	563	305	167	208	201	8,187
San Diego	1	3	46	54	39	13	29	28	12	5	3	.....	233
Ventura	13	2	68	101	166	116	139	163	150	135	126	83	1,262
Others	.....	.....	3	.....	.....	2	.....	.....	.....	.....	1	3	9
Total southern district	*455*	*897*	*3,107*	*3,160*	*4,617*	*4,059*	*3,759*	*3,792*	*2,949*	*2,369*	*2,250*	*1,794*	*33,208*
Central district	2,274	2,528	257	36	46	691	946	169	12	4	5	17	6,985
Northern district	224	177	18	2	.....	.....	.....	.....	.....	.....	.....	1	422
Total California	*2,953*	*3,602*	*3,382*	*3,198*	*4,663*	*4,750*	*4,705*	*3,961*	*2,961*	*2,373*	*2,255*	*1,812*	*40,615*

Sources of data: U. S. Dept. Agr. Bur. Agr. Econ. Unpublished data (revised).

sale of oranges. The shipping season of grapefruits, as shown in figure 12, practically coincides with that of Navels. In addition to apples, bananas, and grapefruits, late shipments of grapes and storage pears are available for consumption during the early part of the Navel season, and strawberries appear in the markets during the latter part of the season.

The facts just presented indicate that consumers are offered large quantities of other fruits in competition with oranges. This competition has become more intense during recent years. Table 4 shows the changes between 1920–1921 and 1926–1927 in the carlot shipments of nine of the important fresh fruits which compete more or less with oranges. It will be noted that there has been a substantial increase in the shipments of every one of them. The percentage increases ranged from 11.4 per cent in the case of apples to 71.3 per cent in the case of strawberries. The total increase in the shipments of these nine fruits amounted to 88,593 cars, or 30.5 per cent.

Monthly Shipments of Oranges by Counties, California.—Table 5 gives the average monthly shipments of oranges from the principal orange-producing counties in California for the period from November, 1921, to October, 1926. The average of the monthly shipments gives a reliable indication of the normal movement of oranges from the different counties. It will be noted that each of the main orange-producing counties in the southern district ships oranges every month of the year. The distribution of the shipments throughout the year from the different counties, however, is not the same. For example, the bulk of the oranges produced in Riverside County are shipped during the first half of the season, those in Orange County during the last half of the season. The principal reason for this is that Riverside County produces mostly Navel oranges, while Orange County produces mostly Valencias.

IMPORTANT ORANGE MARKETS IN THE UNITED STATES

Wide Distribution of Oranges.—Sufficient data are not available to make a thorough analysis of the distribution of the United States orange shipments. The data we have, however, clearly indicate that oranges are widely distributed. According to figures collected by the Bureau of Agricultural Economics of the United States Department of Agriculture, Florida oranges in carlots were shipped to 542 cities located in 38 different states of the Union and to 12 cities in Canada during the 1926–27 season. California oranges are even more

TABLE 6

Carlot Unloads of Oranges in 34 Cities by States of Origin
Average 1924–1926 and 1926

City number	City	Origin of unloads									
		Average 1924–1926					1926				
		California	Florida	Others	Imports	Total	California	Florida	Others	Imports	Total
1	Atlanta	49	480			529	63	388		1	452
2	Baltimore	371	864	1	18	1,254	429	853		8	1,290
3	Birmingham	68	294	4		366	77	291	1		369
4	Boston	2,288	1,637	14		3,939	2,380	1,504	9		3,893
5	Buffalo	593	197	10		800	706	206	4		916
6	Chicago	2,964	937	47		3,950	2,628	1,001	57		3,686
7	Cincinnati	321	629	6		956	355	486	1		842
8	Cleveland	972	535	26		1,533	1,066	524	22		1,612
9	Columbus	294	191	9		494	363	172	17		552
10	Dallas	249	24	4		277	230	26	3		259
11	Denver	356	4	1		361	359	4	2		365
12	Detroit	1,413	181			1,594	1,709	304			2,013
13	Ft. Worth	116	9	1		126	134	7	1		142
14	Indianapolis	293	200	9		502	319	226	5		550
15	Kansas City	453	9	2		464	465	7	2	1	475
16	Louisville	168	236	2		406	225	178	2		405
17	Memphis	173	257	4		434	188	288	5	1	482
18	Milwaukee	563	48	1		612	603	58	2		663
19	Minneapolis	813	5	1		819	768	7			775
20	Newark	30	93			123	1	45	1		47
21	New Orleans	113	172	2		287	134	73			207
22	New York	5,984	5,180	26	864	12,054	6,976	4,789	14	844	12,623
23	Omaha	285	1	1		287	281				281
24	Philadelphia	1,478	2,164		26	3,668	1,651	1,933		23	3,607
25	Pittsburg	889	738			1,627	1,018	701			1,719
26	Portland	420	2			422	428	1		5	434
27	Providence	212	260	4		476	228	243			471
28	St. Louis	861	378	11		1,250	938	354	15		1,307
29	St. Paul	281	2			283	283				283
30	Salt Lake City	232				232	223				223
31	Seattle	406	2			408	654	3			657
32	Spokane	130		1		131	142				142
33	Toledo	364	54	2		420	324	58			382
34	Washington	192	389	3		584	261	358	2		621
	Total	24,394	16,174	192	908	41,668	26,609	15,088	165	883	42,745

Source of data: U. S. Dept. Agr. Bur. Agr. Econ. Mimeo. Reports.

widely distributed. The California Fruit Growers Exchange reports carlot sales in over 700 cities in the United States in 1927. During the three years of 1924–1926, 65.1 per cent of Florida shipments were unloaded in 32 of the 34 cities outside of California for which unload figures are available (table 6). On the other hand, only 57.7 per cent of California shipments were unloaded in the entire 34 cities. New York City alone received 21 per cent of Florida total shipments, but only 14 per cent of California total shipments.

Main Markets for Oranges in the United States.—The location and relative importance of the principal markets for oranges in the United States are shown in figure 13. The majority of these markets are located in the midwestern and eastern states. New York City, Chicago, Boston, and Philadelphia are the largest orange-consuming markets. During the three years of 1924–1926, 35 per cent of the total carlot shipments were unloaded in these four markets, and 18 per cent were unloaded in New York City alone.

The black portion of the circles in figure 13 represents the unloads from California, the shaded portion, those from Florida, and the white portion, the imports. In the markets west of St. Louis, California oranges meet with practically no competition, but in those east of St. Louis they meet with intense competition from Florida oranges. As one goes east and south from St. Louis there is a decided tendency for California to supply a smaller proportion and for Florida to supply a larger proportion of the oranges. The cities in the southeastern states receive the bulk of their oranges from Florida. California oranges go into these cities only during the season when Florida oranges are out of market.

CONSUMPTION OF ORANGES

The average consumption of oranges in the United States during the past five years amounted to 29,556,000 boxes annually, which is equivalent to 51 oranges for every person in the country. This amount is considerably larger than was ever consumed before. The trend of per-capita consumption as shown in figure 14 has been upward. Between 1908–1912 and 1923–1927 the increase in the per-capita consumption amounted to 16 oranges, or 46 per cent.

A fact of great importance to the orange industry is that this large increase in consumption has taken place without a corresponding decline in the price. In fact prices have increased during this period.

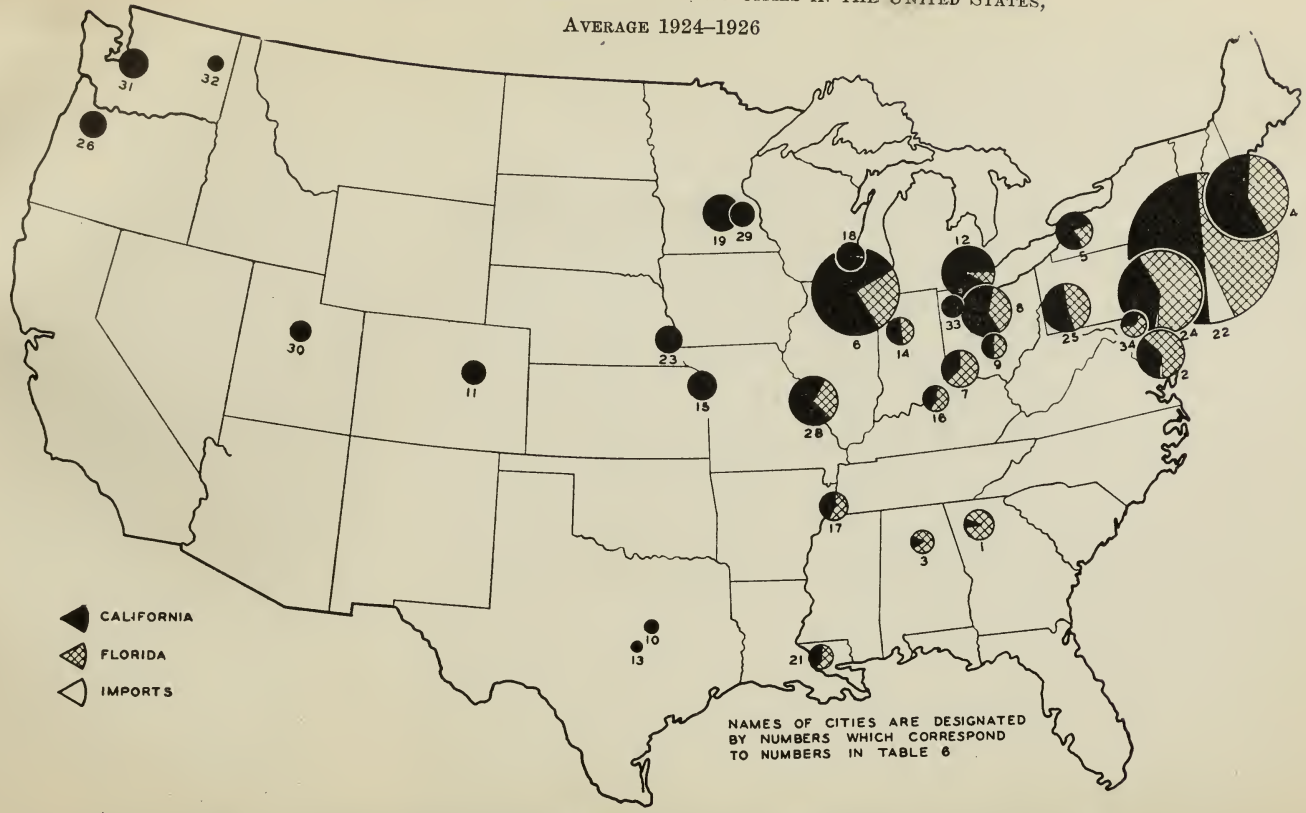


Fig. 13.—The main orange-consuming markets are in the mid-western and eastern states.
(Data from table 6.)

People are not only eating more oranges now than before the war, but they are paying more for them. There has been a substantial increase in the demand for oranges.

This increase in demand which is manifested in both increased consumption and higher prices was a result of many factors. No attempt is made here to measure the influence of each of them. The more important ones, however, are discussed briefly:

1. Workers in nutrition, such as doctors, dieticians, nurses, home-economics teachers, home demonstration agents, and social-service workers, are constantly urging people to eat more oranges because the orange contains valuable food properties in an attractive and available form. These people have done much to promote the consumption of oranges, and they have done it largely without cost to the orange grower.

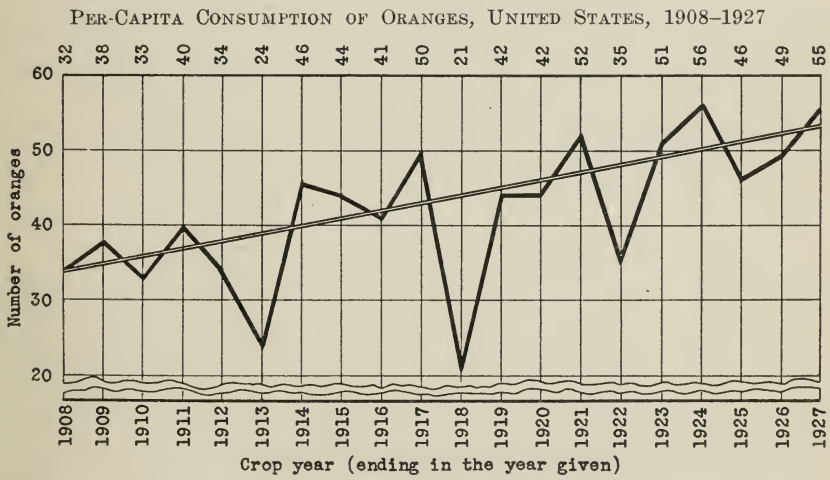


Fig. 14.—People are eating nearly 50 per cent more oranges now than they did twenty years ago. (Data from table 23.)

2. Another powerful stimulus to the increased consumption of oranges is the advertising done by the California Fruit Growers Exchange. That organization has consistently carried on a policy of national advertising for twenty years. It has tied in its advertising efforts with the recommendations of the nutrition workers, thus keeping constantly before the consumers the healthful qualities of the orange. In connection with the advertising program, comprehensive dealer-service activities have been carried on, the main purposes of which are the promotion with the trade of adequate displays, reasonable margins, and rapid turnover.

3. The widening of the market areas and the extension of the marketing season have contributed to the increased consumption of oranges. Formerly oranges were available only in the larger cities; now they are available in practically all sections of the United States. Before the large increase in Valencia orange production in California, oranges were generally available only between October and May; now they are available throughout the year.

4. Within the past five years an important outlet for oranges has been developed, namely, commercial orangeade. The development of this outlet has been largely due to the efforts of the California Fruit Growers Exchange. That organization has sold over 45,000 Sunkist electrical juice extractors at cost to fountains, hotels, restaurants, clubs, and hospitals. Orange juice is now considered to be the most important single use for oranges.

5. The development of a uniformly dependable product has gone far towards increasing the demand for oranges. Consumers can now buy California oranges with the assurance that they are getting a quality product. Standardization of grades and improvement in the methods of handling have been largely responsible for the uniform high-quality oranges now shipped from this state.

PRICES AND PURCHASING POWER

Relative Prices of Oranges Compared with the General Price Level.—The solid line in figure 15 shows the annual prices of all oranges f.o.b. California expressed as percentages of the 1910–1914 average price. During the eight-year period from 1910 to 1917 no definite upward or downward trend in prices is apparent. In 1918 prices rose to an unprecedented height and remained at approximately that height for three years. It is misleading, however, to assume that growers were as much more prosperous during these three years than before 1918 as is indicated by the rise in orange prices, because the prices of practically everything were higher. The broken line represents the general price level of all commodities,[6] and it will be noted that in 1919 and 1920 it was at approximately the same height as the price of oranges. Although the orange grower received over twice as many dollars for a box of oranges in 1919 and 1920 as he did before the war, each dollar would buy less than half as much of all commodities. In other words, the rise in the general price level just

[6] The Bureau of Labor Statistics all-commodity index of wholesale prices in the United States is used to measure the changes in the general price level.

about offset the rise in the price of oranges. Consequently growers could not buy any more of other commodities with the money they received for a box of oranges than they could before 1914. In order to obtain an accurate picture of the influence of changing prices upon the prosperity of the growers, it is necessary, therefore, to make an allowance for the changes in the general price level. In the case of oranges this was done by dividing their price by the Bureau of Labor Statistics all-commodity index number of wholesale prices in the United States. The figure thus obtained is commonly called purchasing power.

Relative Prices of Oranges and the All-Commodity Index, 1910–1927
(Average 1910–14 = 100)

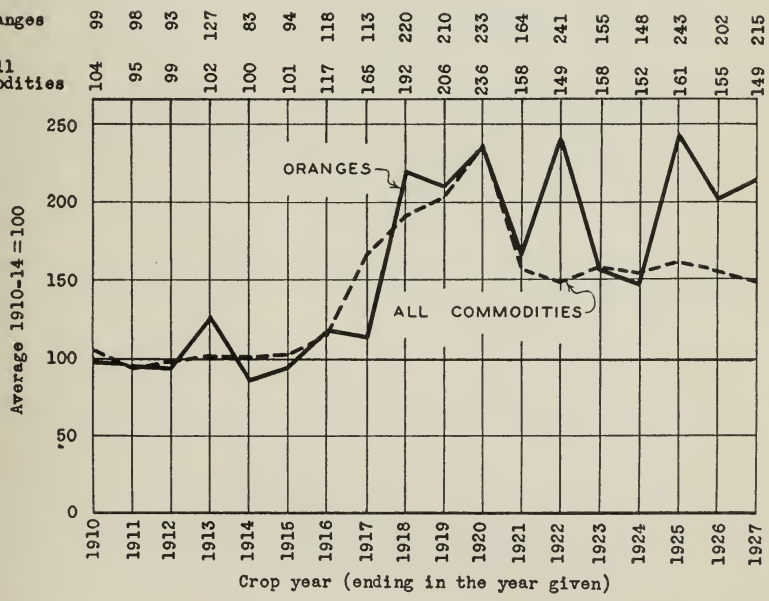


Fig. 15.—As compared with their pre-war levels orange prices have been considerably higher during the past three years than the prices of 'all commodities.'

(Data from table 25.)

Purchasing Power of All Oranges.—The purchasing power of all oranges f.o.b. California is shown in figure 16. Between 1910 and 1924 there was no significant change in the level of purchasing power. The yearly values fluctuated about the pre-war level but never stayed either far above or far below it for more than one year. During the past three years, however, the situation has been much different.

The purchasing power has been maintained at a substantially higher level. Considered from the standpoint of purchasing power, the period from 1925 to 1927 was apparently the most prosperous three-year period which the industry has had in twenty years.

PURCHASING POWER OF ALL ORANGES, F. O. B. CALIFORNIA, 1910–1927
(Average 1910–14 = 100)

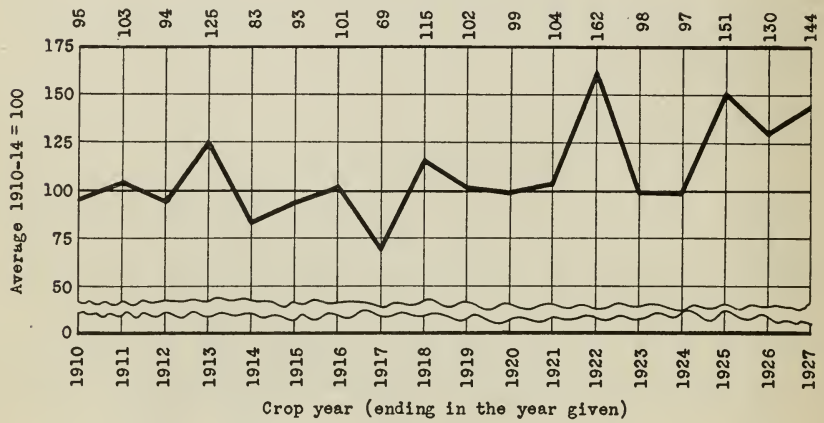


Fig. 16.—Between 1910 and 1924 no definite upward or downward trend in the purchasing power of all oranges occurred. Since 1924 the purchasing power has been maintained at a new high level. (Data from table 25.)

A comparison of the purchasing power of oranges with that of other farm products brings out striking differences. Producers of staple commodities such as wheat, corn, and the livestock products, were relatively more prosperous than orange growers during and immediately after the war. Since 1920, however, the situation has been reversed. The post-war depression, which had such a disastrous effect upon most of the great agricultural industries, was scarcely felt by the orange grower.

Purchasing Power of Valencias.—The purchasing power of Valencia oranges f.o.b. California between 1910 and 1927 is shown by the solid line in figure 17. The variations in purchasing power from year to year have generally been in the opposite direction from the variations in shipments which are shown by the broken line. Throughout the entire sixteen-year period from 1912 to 1927, with the exception of two years, purchasing power varied inversely with shipments. Large shipments were accompanied by low purchasing power, small shipments by high purchasing power. Other factors such as

weather conditions in the consuming markets, quality and sizes of the oranges, and the competition of other fruits also affect the variations in purchasing power from year to year. For example, the failure of the purchasing power of Valencias to decline with the increase in shipments in 1927 is largely explained by the fact that the volume of other fruits marketed in competition with them was much smaller in 1927 than in 1926.

California Valencia Oranges: Purchasing Power, 1910–1927; Shipments, 1912–1927

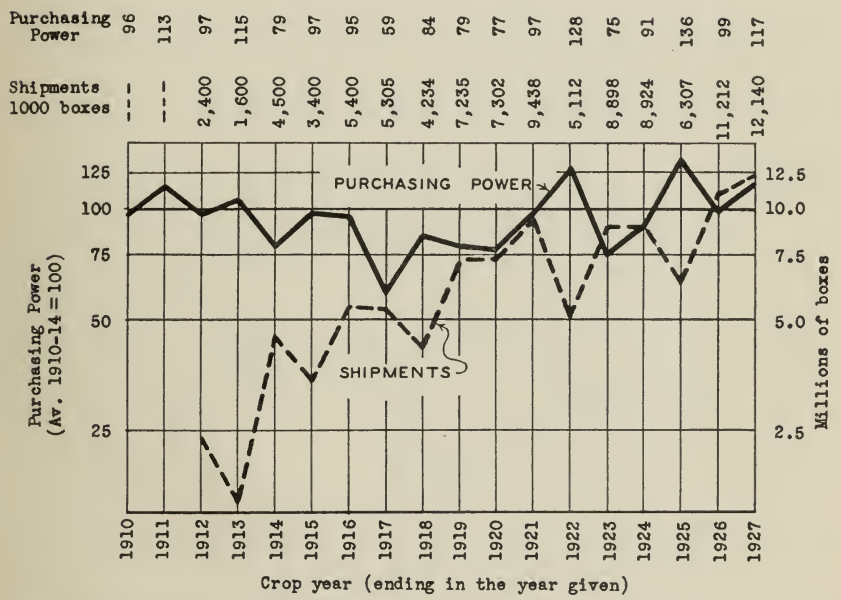


Fig. 17.—Between 1910 and 1920 the trend of purchasing power of Valencia oranges was downward; since 1920 it has been upward.
(Data on shipments from figure 8, on purchasing power from table 25.)

In figure 17 it will be noted that a significant change in the trend of purchasing power of Valencias has occurred. Between 1910 and 1920 the trend was downward; since 1920 it has been upward. One important cause for the downward trend was the large increase in shipments. The decline in purchasing power, however, was much less than the increase in shipments. This indicates that the demand for Valencias was substantially increased.

During recent years the trends of both purchasing power and shipments have been upward. The relative increase in shipments,

however, has not been as large as before. The demand for Valencias has increased even more than the increase in shipments. Consequently purchasing power has tended to rise. During the past three years it has averaged 17 per cent above the pre-war level. This recent upward trend in purchasing power, however, should not be expected to continue. Indications are that the probable increase in shipments during the next few years will be sufficient to supply any reasonable increase in demand. On the other hand, the present level of values can probably be maintained.

Purchasing Power of California Navel Oranges, 1910–1927, and Combined Shipments of California Navel and Florida Oranges, 1912–1927

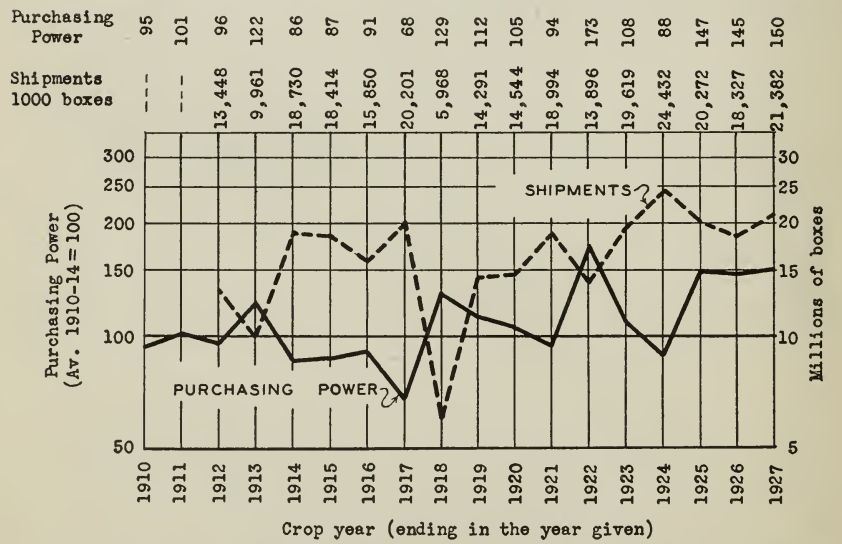


Fig. 18.—Since 1924–25 the purchasing power of Navel oranges has averaged almost 50 per cent above the pre-war level. The variations in purchasing power from year to year are caused mainly by fluctuations in shipments.
(Data on shipments from figure 8, on purchasing power from table 25.)

Purchasing Power of Navels.—The purchasing power of Navel oranges f.o.b. California is shown by the solid line in figure 18. The combined shipments of California Navels and Florida oranges are shown by the broken line. The changes in the purchasing power from year to year are closely related to the changes in shipments. With only one exception an increase in shipments was accompanied by a decline in purchasing power, and conversely, a decrease in shipments was accompanied by an increase in purchasing power.

The shipments of Florida oranges were combined with those of California Navels in measuring the effect of shipments upon prices. The fact that the volume of Florida oranges on the market has an important effect upon the prices received for California Navels is clearly shown in figure 19. The weekly average prices of California oranges on the New York auction market during the 1925–26 Navel season, the number of boxes of California oranges sold, and the total number of boxes sold are given in this figure. It will be noted that the price of California oranges is more closely correlated with the total boxes sold than with the boxes from California alone.

Prices of California Oranges and Volume of California and Florida Oranges Sold on the New York Auction Market by Weeks, December 4, 1925, to April 23, 1926

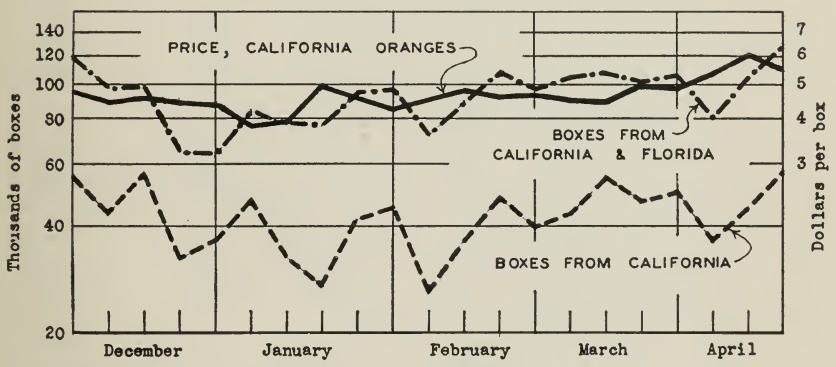


Fig. 19.—The volume of Florida oranges affects the price of California Navels. (Data from table 7.)

There has been a substantial increase in the demand for oranges during the Navel season, particularly since the war. A fairly definite idea of the extent of the increase may be obtained by comparing the average shipments and purchasing power for the three years 1919 to 1921 with the past three years. Between these two three-year periods shipments increased 25 per cent, and purchasing power, 41 per cent. Consumers not only bought more oranges, but they paid more for them as well.

The trend of purchasing power of Navels has been somewhat different from that of Valencias. It will be recalled that the trend of Valencia purchasing power was downward between 1910 and 1920. Navels did not experience a similar decline. For the fifteen years before 1925 the trend of Navel purchasing power was maintained at

approximately the pre-war level, with the yearly values fluctuating above and below it. During the past three years, however, a new high level of purchasing power has been established, which has averaged 47 per cent above the pre-war level. And the present indications are that the purchasing power of the 1927–28 Navel crop will be even higher.

TABLE 7

PRICES OF CALIFORNIA ORANGES AND SALES OF CALIFORNIA AND FLORIDA ORANGES, NEW YORK AUCTION MARKET, DECEMBER 4, 1925, TO APRIL 23, 1926

Week ending	Price of California oranges	Sales of oranges from		
		California	Florida	Total
	dollars per box	*boxes*	*boxes*	*boxes*
Dec. 4	4.79	55,174	63,893	119,067
11	4.46	43,639	54,575	98,214
18	4.57	56,014	43,357	99,371
25	4.45	32,755	32,306	65,061
Jan. 1	4.40	36,782	27,622	64,404
8	3.80	47,881	37,436	85,317
15	3.91	32,932	45,376	78,308
22	4.93	27,217	50,482	77,699
29	4.60	41,731	54,379	96,110
Feb. 5	4.29	45,545	52,477	98,022
12	4.50	26,044	46,561	72,605
19	4.82	36,345	54,066	90,411
26	4.64	48,374	59,567	107,941
Mar. 5	4.68	39,834	58,316	98,150
12	4.55	43,579	62,974	106,553
19	4.49	54,603	53,766	108,369
26	4.97	47,526	56,396	103,922
Apr. 2	4.88	50,115	56,711	106,826
9	5.38	36,521	44,492	81,013
16	6.02	45,652	60,169	105,821
23	5.42	57,067	71,031	128,098

Source of data: Bureau of Railway Economics. Oranges, commodity prices in their relation to transportation costs. Bureau of Railway Economics Bul. **22**: 14, 1927.

It should not be assumed, however, that the present high level of purchasing power of Navel oranges can be maintained during the coming years. It has already been pointed out that there will probably be an enormous increase in orange production in Florida within the next few years. As a result, the supply of oranges available for consumption between November and April is likely to increase faster than demand has ever increased in the past or than it may reasonably be expected to increase in the future.

Prices by Size.—It is well known that the various sizes of oranges generally sell for different prices per box. Sometimes large oranges bring more than small oranges; at other times they bring less. The solid line on the left in figure 20 shows the average prices per box for the different sizes of Valencia oranges between 1924 and 1927. The price of each size is expressed as a percentage of the average price of 176's, 200's, and 216's. It will be noted that during the four-year period the sizes from 126's to 200's, inclusive, brought the highest prices on the average. Each size larger than 126's and smaller than 200's brought a lower price than the preceding size. Thus the price of 80's was lower than that of 100's, and the price of 252's was lower than that of 216's.

Relative Prices of Various Sizes of Valencia Oranges, Average 1924–27 Annual 1926 and 1927; and Percentage of Each Size Shipped 1926 and 1927

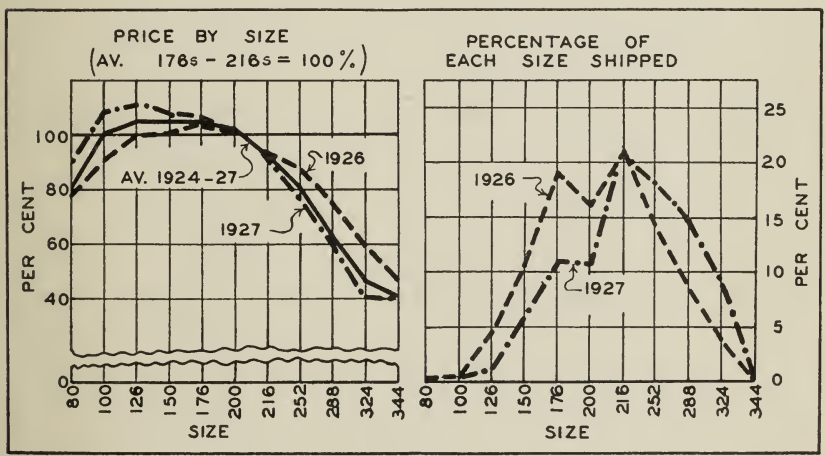


Fig. 20.—The variations in the relative prices of the several sizes of Valencia oranges from year to year are largely accounted for by differences in the volume of each size shipped. (Data from tables 8 and 9.)

The relative prices of the different sizes of Navel oranges for the three years of 1925 to 1927 are shown in table 8. A comparison of the relative prices of the various sizes of Navels and Valencias bring out certain differences. In the first place the price differentials between the sizes are not usually as large with Navels as with Valencias. In the second place, the prices of the large Navels are relatively lower and the prices of the small Navels relatively higher than in the case of Valencias. The chief reason for this is that the sizes of Navels run larger on the average (see table 9).

TABLE 8

RELATIVE PRICES OF THE DIFFERENT SIZES OF VALENCIA AND NAVEL ORANGES IN SOUTHERN CALIFORNIA

(Average price of sizes 176's–216's = 100)

Size	Valencias					Navels			
	1923–24	1924–25	1925–26	1926–27	Average 1923–24 to 1926–27	1924–25	1925–26	1926–27	Average 1924–25 to 1926–27
80	88.3	65.9	78.2	89.9	80.6	101.2	86.8	84.9	91.0
100	116.8	84.9	91.4	108.0	100.3	100.7	89.3	87.9	92.6
126	118.9	90.2	100.1	111.1	105.1	99.9	92.2	93.1	95.1
150	114.9	93.7	101.3	107.9	104.4	105.1	96.9	98.4	100.1
176	110.1	99.7	103.9	106.4	105.0	104.6	100.0	101.3	101.9
200	103.8	102.3	101.6	101.7	102.3	100.2	100.1	100.8	100.4
216	86.0	98.0	93.7	90.9	92.2	95.3	99.3	98.6	97.7
252	69.7	89.8	87.9	77.3	81.2	90.5	96.4	93.0	93.3
288	50.1	70.4	75.9	60.2	64.1	78.5	88.2	83.2	83.3
324	29.8	53.0	59.7	41.9	46.6	66.7	74.3	71.9	71.0
344	34.7	42.1	47.2	41.2	41.3	62.1	68.5	63.3	64.6

Source of data: Compiled from records of orange packing houses in Riverside, San Bernardino, Los Angeles, and Orange counties.

TABLE 9

PERCENTAGE OF EACH SIZE OF VALENCIA AND NAVEL ORANGES SHIPPED BY THE CALIFORNIA FRUIT GROWERS EXCHANGE FROM SOUTHERN CALIFORNIA IN 1926 AND 1927

Size	Valencia		Navels	
	1926	1927	1925–26	1926–27
80 and larger	0.1	0.1	0.6	.....
100	0.9	0.5	3.6	5.8*
126	4.4	2.7	11.2	14.5
150	11.9	6.9	17.2	19.6
176	18.5	12.1	18.5	19.4
200	17.2	11.6	14.2	12.6
216	22.4	22.7	15.9	13.6
252	13.2	18.2	9.4	7.4
288	7.8	14.5	5.4	7.1†
324	3.0	8.7	2.8	.....
344 and smaller	0.6	2.6	1.2	.....
Average size	207.3	230.8	191.9	182.4

* 100's and larger.

† 288's and smaller.

Source of data: California Fruit Growers Exchange.

The differences in the prices of the various sizes of Valencia oranges indicate the necessity of pooling by size in order to maintain the proper differential between growers. If all of the sizes were pooled together, it is obvious that the growers who consistently delivered a relatively large proportion of the small sizes would benefit at the expense of those who consistently delivered a relatively large proportion of the sizes between 100's and 216's.

Seasonal Variation in the Prices of California Oranges, Average 1922–23 to 1926–27; Annual 1924–25 and 1926–27

(Crop-year average price equals 100 per cent)

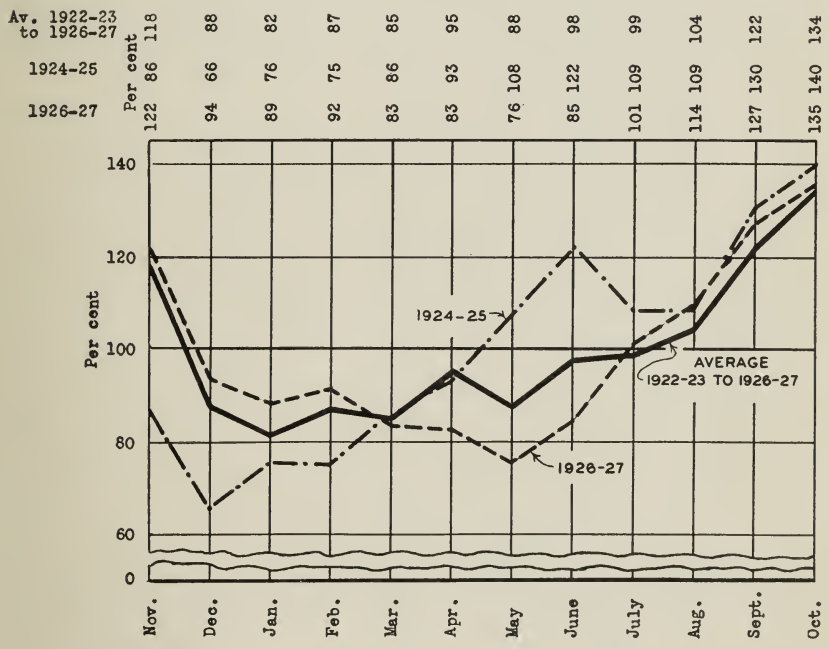


Fig. 21.—There is usually a pronounced fall in the prices of oranges during the first two months of the Navel season and a substantial rise during the last two months of the Valencia season.

(Data compiled from table 26.)

There is considerable variation in the prices of the different sizes from year to year. In 1927, for example, large Valencia oranges brought relatively higher prices than in 1926, while small ones brought relatively lower prices. The differences in the relative prices of the various sizes during these two years are largely explained by the differences in the volume of each size shipped. It will be noted on

the right side of figure 20 that the large sizes were relatively less numerous and the small sizes relatively more numerous in 1927 than in 1926. It is likely that the small sizes would have brought even lower prices in 1927 had it not been for the increased consumption of orange juice, for which small oranges can be used advantageously.

Seasonal Variation in Prices.—During the past five years the price of Valencias has averaged 65 cents a box higher than the price of Navels. The higher average price of Valencias is largely due to the fact that they are marketed during the time of the year when orange prices are normally higher and not because they are a better orange from the consumer's standpoint. The reason why the prices of oranges are normally higher during the Valencia season are chiefly two: first, smaller shipments of oranges, and second, warmer weather, which is conducive to heavy consumption of orange juice.

The average seasonal variation in the prices of oranges for the past five years is shown by the solid line in figure 21. Prices were usually very high at the beginning of the Navel season because of the limited supply of a new crop. They began to fall almost immediately, however, and continued downward during December and January. The chief cause for the precipitous drop in prices in December was the rapid increase in shipments (see fig. 9, p. 17). In January shipments were generally smaller than in December, yet prices were usually lower. This is largely explained by the slackening in demand after the holidays. During February, March, and April there seems to have been a gradual increase in the seasonal demand for oranges. Prices in February were generally higher than in January, although the shipments were about the same. In March shipments increased substantially, but prices did not fall very much. And in April prices usually advanced more than shipments declined. On the other hand, there was usually some decline in the seasonal demand for oranges in May, which was probably due largely to the competition of early fresh fruits and vegetables. This decline in demand is shown by the fact that both prices and shipments were lower on the average in May than in April. After May prices began to rise, and they generally continued upward for the remainder of the season. The most important cause for this rise was the steady decline in shipments.

It should be clearly understood that the above discussion of the average seasonal variation in prices refers only to general tendencies. In any given year the movement of prices during the season may vary considerably from the average. This is illustrated by the broken

lines in figure 21, which show the price movements during 1924–25 and 1926–27. It will be noted that in 1924–25 the lowest price for the year was in December, while in 1926–27 it was in May. In fact prices in both May and June of 1927 were unusually low, while in the same two months of 1925 they were unusually high. These illustrations serve to emphasize the fact that each season presents somewhat of a different problem in distribution, and that conditions during a given year may justify an action opposite to that which is usually the best. Since the orange industry is highly organized in cooperative marketing, it would seem wise for growers to follow the suggestions of their organization regarding the time of shipping, because it is certainly in a better position than they to determine how much and in what direction the price movement during any given year is likely to vary from the average.

UNITED STATES FOREIGN TRADE IN ORANGES

Imports.—Practically all of the United States imports of oranges come from Porto Rico. During the past twenty years the trend of imports from Porto Rico has been upward (see table 23, page 55). The percentage increase in imports between 1908–1912 and 1923–1927 amounted to 41 per cent. During the same period our production increased 87 per cent.

From the standpoint of additions to the United States supply of oranges, imports are almost negligible. Between 1923 and 1927 the average imports amounted to only 397,000 boxes annually, while our production amounted to 31,757,000 boxes. Imports, therefore, were only 1.2 per cent as large as domestic production.

The bulk of the Porto Rican oranges come into the United States between October and April (table 10). During the past three years 97 per cent of the total imports were received in these seven months, and 61 per cent were received in the three months of October, November, and March. It is seen, therefore, that although imports compete to some extent with late Valencias, the chief competition is with Navels. In no case, however, is the competition serious, nor is it likely to become serious in the near future.

Exports.—The United States exports of oranges are very much larger than her imports. During the past five years the average exports have amounted to 2,597,000 boxes annually, which is equivalent to 8.2 per cent of our total production.

The amount of oranges exported each year from 1908 to 1927 is shown in figure 22. It will be noted that there has been a pronounced

upward trend in exports during this twenty-year period. The increase in exports between 1908–1912 and 1923–1927 amounted to 158 per cent. It will be recalled that during the same time our production increased 87 per cent. Exports, therefore, have increased relatively faster than production.

The absolute increase in exports, however, has been small as compared with the absolute increase in production. Between 1908–1912 and 1923–1927 production increased 14,752,000 boxes, while exports increased only 1,569,000 boxes. Export markets, therefore, offered an outlet for only 10.5 per cent of our increase in production. The remaining 89.5 per cent of the increase was consumed in this country.

TABLE 10

UNITED STATES IMPORTS OF ORANGES FROM PORTO RICO BY MONTHS, NOVEMBER 1924 TO OCTOBER 1927

Month	Year			Average 1924–25 to 1926–27	
	1924–25	1925–26	1926–27		
	boxes	*boxes*	*boxes*	*boxes*	*per cent*
November	47,563	125,887	58,783	77,411	20.2
December	22,577	59,948	27,176	36,567	9.5
January	24,987	24,085	5,574	18,215	4.8
February	27,769	50,114	37,761	38,548	10.1
March	78,189	68,049	62,435	69,558	18.1
April	52,266	18,778	48,894	39,979	10.4
May	3,974	4,944	6,498	5,139	1.3
June	328		24	117	
July	384	53	26	154	0.1
August	1,168	701	1,491	1,120	0.3
September	7,442	3,488	20,944	10,625	2.8
October	102,910	59,907	95,310	86,042	22.4
Total	369,557	415,954	364,916	383,475	100.0

Source of data: U. S. Dept. Commerce, Bur. Foreign and Domestic Commerce, San Francisco Office.

Exports of oranges by months from November, 1922, to October, 1927, are given in table 11. The average percentage of the total exports by months for the five-year period indicates the normal seasonal movement. As compared with the seasonal movement of the total orange shipments in the United States (figure 9), exports are relatively small between November and April and relatively large between May and October. Most of the foreign orange-exporting countries, except the Union of South Africa, ship their oranges during the winter and spring months. Consequently, the keenest competition which our oranges meet in foreign markets is during these months.

United States Domestic Exports of Oranges, 1908–1927

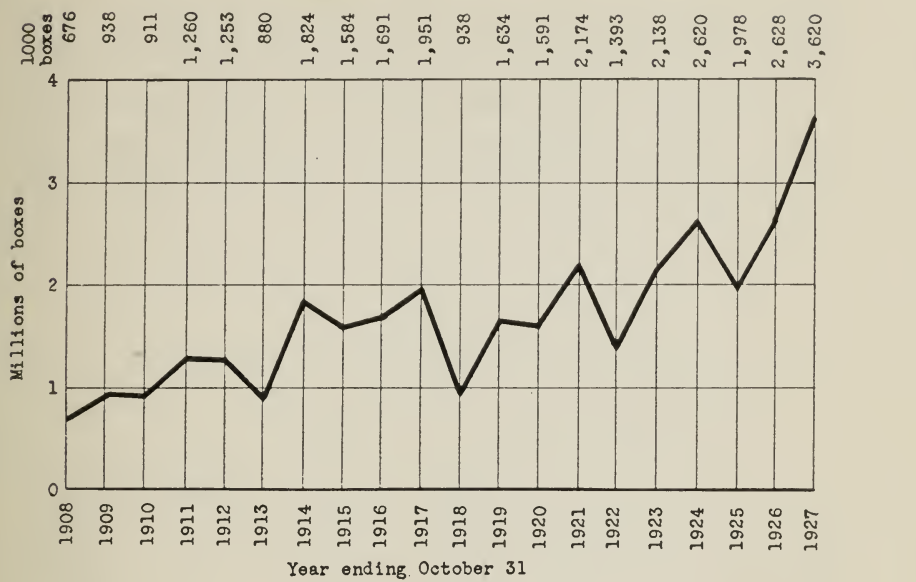


Fig. 22.—During the past twenty years there has been a pronounced upward trend in the exports of oranges from the United States.

(Data from table 12.)

TABLE 11

United States Exports of Oranges by Months, November 1922 to October 1927

Month	1922–23	1923–24	1924–25	1925–26	1926–27	Average 1922–23 to 1926–27	
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*per cent*
November	86	90	140	113	148	115	4.4
December	215	368	262	291	321	291	11.2
January	171	172	221	171	233	194	7.5
February	173	227	140	189	232	192	7.4
March	234	245	239	279	333	266	10.2
April	193	300	193	265	389	268	10.3
May	260	264	197	278	446	289	11.2
June	215	335	186	254	450	288	11.1
July	206	209	142	219	376	231	8.9
August	155	164	127	236	298	196	7.6
September	117	130	76	205	217	149	3.7
October	113	116	55	128	177	118	4.5
Total	2,138	2,620	1,978	2,628	3,620	2,597	100.0

Source of data: U. S. Dept. Commerce Monthly Summary of Foreign Commerce of the United States. Monthly issues.

Main Foreign Markets for Oranges.—Canada is our main foreign market for oranges. Of our total average exports of 2,597,000 boxes during the past five years, 2,211,000 boxes, or 85 per cent, were to Canada. Exports to Canada have increased substantially in the past 15 years. Between 1913–1917 and 1923–1927 the increase amounted to 707,000 boxes, or 47 per cent (table 12). In 1927 exports to that country amounted to 2,707,000 boxes, which is 16.5 per cent larger than in any previous year, and 22.4 per cent larger than the 1923–1927 average.

TABLE 12

UNITED STATES EXPORTS OF ORANGES BY COUNTRIES OF DESTINATION
1913–1927

Year ending October 31	Country of destination			Total
	Canada	United Kingdom	Others	
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1913	835	13	32	880
1914	1,754	32	37	1,824
1915	1,500	36	47	1,584
1916	1,589	28	74	1,691
1917	1,841	16	94	1,951
1918	898	3	37	938
1919	1,513	48	73	1,634
1920	1,477	13	101	1,591
1921	1,984	40	150	2,174
1922	1,323	3	67	1,393
1923	1,971	39	127	2,138
1924	2,323	114	182	2,620
1925	1,812	42	124	1,978
1926	2,240	218	170	2,628
1927	2,707	605	309	3,620

Source of data: Compiled from U. S. Dept. Commerce, Monthly Summary of Foreign Commerce of the United States, monthly issues.

United States oranges meet with practically no competition in the Canadian market from those grown in other countries. In the year ending March 31, 1927, almost 95 per cent of the total orange imports into Canada were from the United States (table 13). Japan was the next most important source of Canadian supplies. Practically all of the Japanese exports to Canada are mandarins. Only a very limited quantity of European oranges are imported into Canada.

The United Kingdom is our second most important foreign market for oranges. Our shipments to the United Kingdom, however, are very small as compared with those to Canada. For many years before 1926, they averaged around 40,000 boxes annually. In 1926 they

amounted to 218,000 boxes, and in 1927 to 605,000 boxes. These large increases indicate that we have secured a foothold in the British market. An important reason why we were able to sell so many oranges in Great Britain during the past two years was that the Spanish oranges were damaged by frost in 1925 and by frost and wind in 1926. During the 1925–26 crop season large quantities of frost-damaged oranges were exported from Spain. Many of these reached the British markets in poor condition and thus brought discredit to them. The poor quality of the Spanish oranges in that season undoubtedly contributed to large purchases of our oranges.

TABLE 13

CANADIAN IMPORTS OF ORANGES BY COUNTRIES OF ORIGIN 1924–1927

Country of origin	Year ending March 31				
	Value*			Quantity	
	1924	1925	1926	1926	1927
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 boxes*	*1,000 boxes*
United States	5,530	6,196	7,087	1,617	2,144
Japan	276	167	221	81	94
Italy	14	9	7	3	†
United Kingdom	19	11	25	5	†
Other countries	33	27	66	24	25
Total	5,872	6,410	7,406	1,730	2,263

* Prior to 1926 Canadian imports of oranges were reported by value only.

† Included in others.

Sources of data:
Years 1924–26, U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets **14**: 254, 1927.
Year 1927, U. S. Dept. Agr. Bur. Agr. Econ. The Canadian market for citrus fruits. F. S. CF-43. 1927.

When the Spanish oranges were again damaged by frost in December, 1926, the Spanish government immediately took steps to prevent the shipment of damaged fruit. In addition to frost damage, the 1926–27 crop was further reduced by a violent wind and rain storm. Although figures are not yet available on the amount of oranges actually exported from Spain in 1927, the opinion of Consul Clements S. Edwards in January, 1927, was that exports would fall considerably below the levels of the past five seasons.[7]

So far the United States has furnished only a very small part of the orange supplies of Great Britain (table 14). Even in 1926, when

[7] U. S. Dept. Agr., Bur. Agr. Econ. Spanish orange crop seriously injured. F. S. CF–39, p. 1. 1927.

we shipped more oranges to Great Britain than in any previous year, our shipments amounted to only 2 per cent of total British imports. Spain has always been the principal source of the British supply of oranges. Of the average yearly imports of 12,339,000 boxes between 1923 and 1926, Spain contributed 80 per cent; Palestine, 11 per cent; Union of South Africa, 4 per cent; and other countries, 5 per cent. Shipments of oranges from Palestine and the Union of South Africa have increased rapidly during recent years, and as a result Spanish oranges are meeting with considerably more competition in the British markets.

TABLE 14

IMPORTS OF ORANGES INTO THE UNITED KINGDOM BY COUNTRIES OF ORIGIN 1909–1926

(Boxes of 70 pounds net)

Calendar year	Spain	Italy	United States	Palestine	British West Indies	Union of South Africa	Others	Total
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1909	8,790	209	71	*	198	*	656	9,924
1910	7,709	168	53	*	206	*	615	8,751
1911	7,236	301	69	*	148	*	701	8,455
1912	7,928	133	70	*	135	*	633	8,899
1913	8,035	183	39	*	119	*	892	9,268
1914	6,870	243	39	*	80	*	941	8,173
1915	9,177	123	54	*	72	*	184	9,610
1916	9,065	166	33	*	56	*	80	9,400
1917	4,336	141	10	*	16	*	6	4,509
1918	3,705	490	1	*	11	*	18	4,225
1919	7,627	276	56	*	123	58	182	8,322
1920	6,273	259	13	*	92	127	279	7,043
1921	8,335	165	46	393	113	219	101	9,372
1922	9,799	107	6	756	103	276	125	11,172
1923	10,359	101	47	1,105	117	334	139	12,202
1924	9,833	90	128	1,288	96	433	163	12,031
1925	9,617	93	45	1,560	112	668	271	12,366
1926	9,753	87	249	1,606	138	603	321	12,757

* Included in "Others."

Source of data: Annual Statement of the Trade of the United Kingdom, annual numbers.

FOREIGN ORANGE PRODUCTION

The principal orange-producing countries in the world other than the United States are Spain, Italy, Japan, China, Palestine, Union of South Africa, Australia, British West Indies, Cuba, Mexico, Porto Rico, Brazil, Algeria, and Greece. Detailed information on the orange situation in all of these countries is not available at the present time. The available data on production in the various countries are given in table 15 and on exports in table 16.

Spain.—Spain ranks next to the United States in the world production of oranges. During the three years of 1923–24, 1925–26, and 1926–27 the average annual production in Spain was 32,771,000 boxes, while the average annual production in the United States was 33,649,000 boxes.

It is expected that there will be a substantial increase in orange production in Spain during the next few years. Large numbers of trees have been planted in the past six years. The commercial acreage in 1925–26 was placed at 127,175 acres.

Approximately 60 per cent of the Spanish oranges are exported. Exports of oranges from Spain have increased substantially during recent years. In 1926 exports amounted to 22,585,000 boxes as against an average of 13,607,000 boxes between 1921 and 1923 and 15,918,000 boxes between 1909 and 1913.

TABLE 15

ORANGE PRODUCTION IN CERTAIN FOREIGN COUNTRIES

(Boxes of 70 pounds net)

Crop year ending in	Spain	Italy	Palestine	Japan	Australia	Algeria	Mexico
	1	2	3	4	5	6	7
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1916	.....	8,844	.....	8,073	.....	.....	.....
1917	.....	9,477	.....	4,090	.....	.....	.....
1918	.....	9,566	.....	5,836	.....	.....	.....
1919	.....	9,571	.....	7,057	.....	.....	.....
1920	.....	8,995	.....	7,708	1,550	.....	.....
1921	.....	9,483	807	.....	1,769	.....	.....
1922	.....	10,213	1,199	7,143	1,961	1,927	340
1923	.....	.....	1,327	7,823	1,985	2,236	360
1924	25,741	9,001	1,544	7,351	1,932	.....	.....
1925	.....	9,168	2,085	7,326	2,098	.....	.....
1926	38,674	.....	1,468	9,802	.....	.....	.....
1927	33,898	.....	2,429	.....	.....	.....	.....

Sources of data:

Col. 1.—Year 1924: U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets **14**: 240. 1927.

Years 1926, 1927. Moriarity, D. J. Spanish foreign trade in fresh fruits. Citrus Leaves **8** (2): 3. 1928.

Col. 2.—U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets **14**: 242. 1927. Includes production in six provinces which produce approximately 98 per cent of the total Italian crop. Mandarin production, which amounts to about 10 per cent of the total, is included.

Col. 3.—U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets **14**: 247. 1927. Cases converted to boxes on the basis of 68 pounds per case.

Col. 4.—Japan. Statistical Abstract of the Ministry of Agriculture and Forestry **1926**: 9. 1927. Does not include bitter oranges, the production of which varies from one to two million boxes.

Col. 5.—Years 1920–1924. U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets. **14**: 249. 1927.

Year 1925. Commonwealth of Australia, Official Year Book **1926**: 669. 1927. Data given in British bushels, which were converted to boxes on the basis of 1.46 bushels per box.

Col. 6.—U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets. **14**: 246. 1927. Includes mandarins, which amounted to 989,000 boxes in 1922, and 1,130,000 boxes in 1923. The acreage of all oranges in Algeria in 1923 was 18,000 acres.

Col. 7.—Mexico. Dept. de la Estadistica National—Exposicion Numerica Sabre Censo. *p. 19.* 1924.

The principal markets for Spanish oranges are Great Britain, Germany, Holland, and Belgium (table 17). Before the war France ranked next to Great Britain as a market for Spanish oranges, but since 1922 the French imports from Spain have been very small. On the other hand, Holland and Belgium are now buying almost twice as many Spanish oranges as they did before the war. Although exports from Spain to Great Britain have increased, they have not increased as rapidly as the total exports. Between 1909–1913 and 1924–1926 the increase in total Spanish exports amounted to over 6,000,000 boxes; the increase in exports to Great Britain amounted to only 1,630,000. The United Kingdom, therefore, furnished an outlet for only one-fourth of the increase in Spanish exports. The remaining three-fourths found outlets in other European countries.

TABLE 16

EXPORTS OF ORANGES FROM CERTAIN FOREIGN COUNTRIES

(Boxes of 70 pounds net)

Calendar year	Spain	Italy	Union of South Africa	Brazil	Japan	Cuba
	1	2	3	4	5	6
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Average 1909–13	15,918	3,772				
1920	8,121	2,565	127	100		
1921	13,668	3,495	219	87		
1922	12,633	2,741	276	178		
1923	14,521	2,565	334	331	412	422
1924	21,129	3,878	433	365	309	305
1925	22,511	4,530	668	406	422	364
1926	22,585		603	210		
1927						

Sources of data:

Col. 1.—Years 1909–1913, 1920, 1921, Moriarity, D. J. International trade in citrus fruits. U. S. Commerce Reports. **28**: 746. 1925.

Years 1922–1926. Moriarity, D. J. Spanish foreign trade in fresh fruits. Citrus Leaves **8** (2): 3. 1928.

Col. 2.—Years 1909–1913, 1920–1922, Moriarity, D. J. International trade in citrus fruits. U. S. Commerce Reports **28**: 746. 1925.

Years 1923–1925. U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets. **14**: 243. 1927.

Col. 3.—Imports into the United Kingdom from the Union of South Africa (table 14). Practically all of the South Africa exports go to the United Kingdom.

Col. 4.—Brazil. Directoria de Estatistica Commercial. Commercio Exterior de Brazil. Annual numbers. Numbers of oranges converted to boxes on the basis of 200 oranges per box.

Col. 5.—U. S. Dept. Agr. Yearbook of Agriculture **1926**: 907. 1927.

Col. 6.—Cuba. Importacion y Exportacion de la Republica de Cuba. 1924, 1926.

The shipping season for oranges in Spain extends from November to June. The bulk of them, however, move during the three months of January to March. According to Edwin Smith, "there is not much

to be seen in southern Spain that would lead to the conclusion that oranges are to be produced for shipment during the summer months."[8]

Italy.—Italy is the third largest orange-producing country in the world. From 1916 to 1925 there was no definite upward or downward trend in Italian orange production. The average production during that period amounted to 9,368,000 boxes.

Approximately 37 per cent of the oranges produced in Italy between 1920 and 1925 were exported. During the three years of 1920, 1922, and 1923, exports were a third smaller than before the war. In 1924, however, exports were about equal to the pre-war average, and in 1925 they were one-fifth larger.

TABLE 17

EXPORTS OF ORANGES FROM SPAIN BY COUNTRIES OF DESTINATION
AVERAGE 1909–13. ANNUAL 1923–24 TO 1925–26
(Boxes of 70 pounds net)

Country of destination	Average 1909–13	1923–24	1924–25	1925–26
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Great Britain	7,322	8,320	9,646	8,891
France	3,343	102	49	25
Germany	3,024	1,997	3,523	2,775
Holland	956	2,005	1,952	1,603
Belgium	796	1,511	1,512	1,540

Sources of data:

Years 1909–1913. Moriarity, D. J. International trade in citrus fruits. U. S. Commerce Reports **28**: 746. 1925.

Years 1923–24 to 1925–26. U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets. **14**: 240. 1927.

The principal markets for Italian oranges in 1925 were Germany, Australia, Switzerland, Hungary, and Czechoslovakia. These five countries took 84 per cent of the Italian exports, and Germany alone took 49.5 per cent. Only 1.5 per cent was exported to Great Britain.

The important changes which have taken place in the distribution of Italian exports are shown in table 18. It will be noted that between 1923 and 1925 Germany, Austria, Czechoslovakia, Hungary, and Jugoslavia greatly increased their imports of oranges from Italy. On the other hand, Italian exports to France and Great Britain declined. In 1925 Germany, France, and Switzerland were much more important markets for Italian oranges than before the war, while the four countries of Austria, Czechoslovakia, Hungary and Jugoslavia which formerly made up the old Austria-Hungary Empire, were less important markets, as were also Great Britain and Russia.

[8] U. S. Dept. Agr., Bur. Agr. Econ. The Spanish orange industry. F. S. CF–12, p. 11. 1925.

Palestine.—The production of oranges in Palestine has increased substantially during recent years. The 1926–27 orange crop was estimated at 2,429,000 boxes. This is 17 per cent larger than the record crop of 1924–25 and 60 per cent larger than the average production between 1921–22 and 1925–26.

TABLE 18

EXPORTS OF ORANGES FROM ITALY BY COUNTRIES OF DESTINATION
AVERAGE 1909–1913. ANNUAL 1923–1925
(Boxes of 70 pounds net)

Country of destination	Average 1909–1913	1923	1924	1925
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Austria*	1,963	303	505	744
Czechoslovakia		131	169	222
Hungary		2	65	271
Jugoslavia		91	99	111
France	30	789	219	120
Germany	665	531	1,907	2,244
Great Britain	206	78	74	66
Russia	433			
Switzerland	109	369	373	327
Other countries	367	262	467	425
Total	3,773	2,556	3,878	4,530

* Austria-Hungary. The territory of the old Austria-Hungary Empire roughly approximated what is now Austria, Czechoslovakia, Hungary, and Jugoslavia.

Source of data: U. S. Dept. Agr. Bur. Agr. Econ. Foreign Crops and Markets. **14**: 243, 1927.

Indications are that the production of oranges will be further increased. According to Consul Oscar S. Heizer at Jerusalem "the consensus of opinion is that orange growing is the most profitable business for those farmers who have sufficient capital to purchase land for orange groves and who can afford to wait six years until the trees begin profitable bearing. During the year 1925 about 1,000 acres of land were purchased for the planting of new orange groves." At the present time there are more than 8,000 acres of oranges in full bearing.

Exports of oranges from Palestine have also increased. The best oranges produced in Palestine go to the United Kingdom, where they are evidently meeting with considerable favor.

Union of South Africa.—Exports of oranges from the Union of South Africa to the United Kingdom for the years from 1920 to 1926 are shown in table 16. Since the United Kingdom takes practically all of the South African orange exports, these data serve to indicate the substantial increase in shipments from that country during the past six years.

During the next few years there is likely to be an even greater increase in shipments. Table 19 shows the number of trees of different ages in 1927. Of the 3,050,528 trees, only 678,035 were eight years of age or over. This means that only one-fourth of the trees in 1927 were in commercial bearing, and that three-fourths were not in bearing. With such a large acreage still to come into bearing, it is evident that the production of oranges in the Union of South Africa during the next few years might easily be three or four times as large as it is now.

TABLE 19

NUMBER OF ORANGE TREES IN THE UNION OF SOUTH AFRICA BY VARIETIES AND AGE GROUPS, 1927

Age-group	Navels	Valencias	Other varieties*	Total*
	trees	*trees*	*trees*	*trees*
Under 3 years	408,730	402,090	138,089	948,909
3 to 4 years	393,663	296,026	72,226	761,915
5 to 7 years	411,501	192,094	52,074	661,669
8 years and over	334,464	90,018	253,553	678,035
Total	1,548,358	986,228	515,942	3,050,528

* Includes small numbers of tangerine and lemon trees.

Source of data: U. S. Dept. Agr. Bur. Agr. Econ. South African Citrus fruit industry shows expansion. F. S. CF-47. 1927.

The shipping season for oranges in South Africa is the summer and fall months. Hence they do not meet with serious competition from oranges produced in countries other than the United States.

Australia.—The production of oranges in Australia in 1924–25 amounted to 2,098,000 boxes as against 1,550,000 boxes in 1919–20. Most of the oranges produced in Australia are consumed there. Exports in 1924–25 amounted to only 90,000 boxes, or less than 5 per cent of the total production. New Zealand is the main market for Australian exports. So far exports from Australia to the United Kingdom have been almost negligible.

In 1925 there were 32,400 acres of oranges in bearing in Australia and 14,100 acres not in bearing.

Japan.—Of the 9,802,000 boxes of oranges, other than bitter oranges, produced in Japan in 1926, 88 per cent were mandarins, 4.6 per cent Navels, and 7.4 per cent miscellaneous varieties.

The number of orange trees in Japan between 1916 and 1926 are given in table 20.

Exports of oranges from Japan have ranged between 309,000 and 422,000 boxes. The bulk of the exports are mandarins.

TABLE 20

NUMBER OF ORANGE TREES IN JAPAN, 1916–1926

Year	Mandarins	Navels	Bitter oranges	Other kinds	Total
	1,000 trees	*1,000 trees*	*1,000 trees*	*1,000 trees*	*1,000 trees*
1916	17,273	1,715	4,034	2,959	25,981
1917	17,180	1,849	4,102	2,791	25,922
1918	17,454	1,726	3,915	2,700	25,795
1919	18,448	1,746	5,085	2,655	27,934
1920	18,830	1,659	3,713	2,568	26,770
1921	6,478	783	3,224	1,113	11,598
1922	18,060	1,525	3,471	2,409	25,465
1923	18,247	1,445	3,465	2,277	25,434
1924	18,589	1,389	3,281	2,179	25,438
1925	19,977	1,384	3,319	2,204	26,884
1926	19,795	1,391	3,402	2,274	26,862

Source of data: Japan. Statistical Abstract of the Ministry of Agriculture and Forestry **1926**: 9. 1927.

ACKNOWLEDGMENT

The authors of this bulletin wish to express their thanks and indebtedness to the following organizations which have generously contributed from their data and their time: California Fruit Growers Exchange; California Cooperative Crop Reporting Service; Bureau of Agricultural Economics, United States Department of Agriculture; Bureau of Foreign and Domestic Commerce, United States Department of Commerce; California Farm Bureau Federation; California Agricultural Legislative Committee; and the Division of Agricultural Economics, University of California. Professor Robert W. Hodgson, Division of Subtropical Horticulture, University of California, Mr. Warren R. Schoonover, Extension Specialist in Citriculture, and the farm advisors in the important orange-producing counties have also furnished much valuable information.

APPENDIX OF TABLES

TABLE 21

California Orange Acreage by Counties; Bearing Acreage 1921–1928, and Non-Bearing Acreage 1928

County	Bearing acreage								Non-bearing acreage 1928*
	1921	1922	1923	1924	1925	1926	1927	1928	
Northern dist.	*4,951*	*5,064*	*5,033*	*4,755*	*4,475*	*4,051*	*3,902*	*4,074*	*33*
Butte	2,100	2,100	2,100	1,850	1,750	1,534	1,460	1,540	23
Colusa	55	20	20	20	20	24	19	48	4
Glenn	684	697	707	717	720	778	708	730	.....
Placer	315	275	275	275	235	235	235	235	.....
Sacramento	1,532	1,530	1,530	1,530	1,525	1,410	1,410	1,425	.....
Solano	85	90	90	90	95	14	14	14	.....
Tehama	110	115	66	18	18	20	20	22	4
Yolo	20	17	25	35	17	17	17	17	2
Yuba	50	220	220	220	95	19	19	43	.....
Central dist.	*40,242*	*40,685*	*40,826*	*40,966*	*41,693*	*42,192*	*42,380*	*42,538*	*585*
Fresno	3,600	3,700	3,800	3,900	4,000	4,459	4,500	4,550	150
Kern	1,167	1,167	1,196	1,225	1,281	1,239	1,317	1,399	75
Merced	38	35	20	5	7	9	16	17	90
San Joaquin	49	52	52	52	52	130	130	130	1
Stanislaus	94	68	83	98	114	116	136	136	1
Tulare	35,294	35,663	35,675	35,686	36,239	36,239	36,281	36,306	268
Southern dist.	*126,735*	*129,666*	*130,961*	*132,257*	*135,173*	*137,817*	*139,609*	*140,669*	*18,704*
Imperial	.....	.....	.....	.....	.....	.....	57	57	42
Los Angeles	39,987	39,825	39,825	39,825	39,879	39,971	40,233	40,427	3,256
Orange	31,500	32,000	32,500	33,000	33,923	35,846	38,141	39,003	10,055
Riverside	14,000	15,000	15,500	16,000	17,000	17,184	16,500	15,764	272
SanBernardino	37,515	38,415	38,587	38,759	39,615	39,968	39,459	39,452	659
San Diego	1,411	1,411	1,411	1,411	1,411	1,411	1,558	1,676	1,503
Santa Barbara	71	95	112	130	135	145	145	165	75
Ventura	2,251	2,920	3,026	3,132	3,210	3,292	3,516	4,125	2,842
State	*171,928*	*175,415*	*176,820*	*177,978*	*181,341*	*184,060*	*185,891*	*187,281*	*19,322*

* Does not include 3,197 acres planted in 1927.

Source of data: Revised figures compiled by N. I. Nielsen, Fruit Statistician, California Cooperative Crop Reporting Service.

TABLE 22

ESTIMATED COMMERCIAL PRODUCTION OF ORANGES, UNITED STATES BY STATES, 1908–1927

(Thousands of boxes, i.e., 000 omitted)

Crop year ending in	California	Florida	Others	Total
	1	2	3	4
1903	8,095	1,465		9,560
1904	10,247	1,951		12,198
1905	10,226	2,363		12,589
1906	8,973	2,961		11,934
1907	10,291	2,899		13,190
1908	10,743	3,793		14,536
1909	13,449	4,279		17,728
1910	11,188	4,853		16,041
1911	15,645	3,749		19,394
1912	13,681	3,648		17,329
1913	6,347	5,761		12,108
1914	17,986	6,230		24,216
1915	15,858	7,314		23,172
1916	15,490	6,150		21,640
1917	20,035	6,933		26,968
1918	7,702	3,500		11,202
1919	17,755	5,700		23,455
1920	16,395	7,000		23,395
1921	21,813	8,100		29,913
1922	12,708	7,300	89	20,097
1923	19,930	9,700	222	29,852
1924	21,546	12,400	285	34,231
1925	16,962	11,000	21	27,983
1926	22,661	8,200	180	31,041
1927	25,969	9,600	106	35,675

Sources of data:

Col. 1.—Compiled by the California Fruit Growers Exchange. The figures are based upon railroad reports of carload shipments at points of passing. Numbers of cars have been converted to boxes on the basis of the California Fruit Growers Exchange average load, which has varied from 374 to 467 boxes per car. Before 1917 grapefruit is included with oranges. The volume of grapefruit at that time was very small, however. The crop year extends from November of the previous year to October of the year shown.

Col. 2.—Year 1903–1908 from California State Board of Agriculture, annual statistical report, **1919**: 163. Years 1909–1915 estimates by the writers. Years 1916–1918 from California State Board of Agriculture, annual statistical report, **1921**: 237. Years 1919–1927 from U. S. Dept. Agr. Bur. Agr. Econ. Market prospects for citrus fruits 1927–28, *p. 8*. Dec. 6, 1927 (mimeo.). These figures include fruit to move by rail and boat. The crop year extends from October of the previous year to June of the year shown.

Col. 3.—Carlot shipment figures as reported to the Bureau of Agricultural Economics converted to boxes on the basis of 400 boxes per car. No data available before 1922.

TABLE 23

UNITED STATES PRODUCTION, IMPORTS, EXPORTS, AND PER-CAPITA CONSUMPTION OF ORANGES

Crop year ending in	United States production	Imports from Porto Rico*	Domestic exports	Supply available for consumption	Per-capita consumption
	1	2	3	4	5
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*Oranges*
1908	14,536	300	676	14,160	31.8
1909	17,728	209	938	16,999	37.5
1910	16,041	278	911	15,408	33.4
1911	19,394	378	1,260	18,512	39.5
1912	17,329	243	1,253	16,319	34.3
1913	12,108	375	880	11,603	24.0
1914	24,216	319	1,824	22,711	46.4
1915	23,172	248	1,584	21,836	44.0
1916	21,640	467	1,691	20,416	40.5
1917	26,968	465	1,951	25,482	49.9
1918	11,202	557	938	10,821	20.9
1919	23,455	385	1,634	22,206	42.3
1920	23,395	328	1,591	22,132	41.6
1921	29,913	167	2,174	27,906	51.5
1922	20,097	508	1,393	19,212	34.9
1923	29,852	615	2,138	28,329	50.7
1924	34,231	218	2,620	31,829	56.0
1925	27,983	370	1,978	26,375	45.7
1926	31,041	416	2,628	28,829	49.2
1927	35,675	365	3,620	32,420	54.6

* Imports for November 1907, 1922, 1923 and December, 1907 estimated.

Source of data:

Col. 1.—Table 22.

Columns 2 and 3.—U. S. Dept. Commerce Monthly Summary of Foreign Commerce of the United States, monthly issues.

Column 4.—Production plus imports from Porto Rico minus domestic exports.

Col. 5.—Supply available for consumption converted to number of oranges on the basis of 200 oranges per box and divided by United States population.

TABLE 24.—Monthly Carlot Shipments of Oranges by States of Origin, Nov. 1921–Oct. 1927

State and crop year	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
	cars	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*	*cars*
California:													
1921–22	1,792	3,536	3,567	1,732	4,222	3,153	3,106	2,006	1,536	1,212	1,084	1,428	28,374
1922–23	1,976	3,596	3,533	4,322	5,734	5,532	6,664	5,080	3,921	2,988	2,819	2,176	48,341
1923–24	3,103	4,081	3,315	4,321	3,863	5,595	4,724	5,322	3,154	2,716	2,604	2,107	44,905
1924–25	4,201	3,041	3,116	2,377	4,370	3,917	3,941	3,287	2,029	1,740	1,726	693	34,438
1925–26	3,695	3,755	3,381	3,238	5,126	5,552	5,091	4,108	4,163	3,210	3,044	2,654	47,017
1926–27*	3,102	4,562	4,184	3,670	6,318	7,051	6,333	4,994	4,070	3,684	3,256	2,350	53,574
Florida:													
1921–22	2,063	4,010	2,756	2,715	1,802	1,086	413	36	1		78	1,253	16,213
1922–23	2,607	4,703	4,139	3,854	2,713	1,798	1,231	309	13	4	23	1,091	22,485
1923–24	6,173	5,162	4,217	4,653	5,428	4,222	1,973	467	8	1		245	32,549
1924–25	4,269	5,749	5,265	4,220	2,664	1,682	867	129	1			447	25,293
1925–26	2,855	3,824	3,325	2,714	2,926	2,793	777	95				483	19,792
1926–27*	2,996	5,279	3,821	4,026	2,748	2,108	863	152	14		3	887	22,897
Alabama:													
1921–22	89	35									5	32	161
1922–23	290	149										4	443
1923–24	320	276											596
1924–25			1	1								18	20
1925–26	285	35											320
1926–27*	108	70										86	264
Arizona:													
1921–22	44	24	1	4		1							74
1922–23	44	25	1									4	74
1923–24	70	16	2				2					1	91
1924–25	38	5							1			7	51
1925–26	66	19	3			1							89
1926–27*	51	19											70
Others:													
1921–22													
1922–23	8	1											9
1923–24	12	1	4	2									19
1924–25	3	1			1								5
1925–26	8	7										4	19
1926–27*	5	4	2	1		1						7	20
Total:													
1921–22	3,988	7,605	6,324	4,451	6,024	4,240	3,519	2,042	1,537	1,212	1,167	2,713	44,822
1922–23	4,925	8,474	7,673	8,176	8,447	7,330	7,895	5,389	3,934	2,992	2,842	3,275	71,352
1923–24	9,678	9,536	7,538	8,976	9,291	9,817	6,699	5,789	3,162	2,717	2,604	2,353	78,160
1924–25	8,511	8,796	8,382	6,598	7,035	5,599	4,808	3,416	2,031	1,740	1,726	1,165	59,807
1925–26	6,909	7,640	6,709	5,952	8,052	8,346	5,868	4,203	4,163	3,210	3,044	3,141	67,237
1926–27*	6,262	9,934	8,007	7,697	9,066	9,190	7,196	5,146	4,084	3,684	3,259	3,330	76,825

* Subject to revision.

Sources of data:

Years 1921–22 to 1925–26 U. S. Dept. Agr. Bur. Agr. Econ. mimeographed sheets, revised.

Year 1926–27 U. S. Dept. Agr. Bur. Agr. Econ. Crops and Markets, monthly issues, except for California which are from Yoeman, Opal V. Summary of carlot shipments of important fruits and vegetables in California, Arizona and Nevada, 1927. U. S. Dept. Agr. Bur. Agr. Econ. mimeographed circular, 1928.

TABLE 25.—WEIGHTED AVERAGE PRICES RECEIVED FOR ORANGES F.O.B. CALIFORNIA BY THE CALIFORNIA FRUIT GROWERS EXCHANGE, 1909–10 TO 1926–27

Crop year*	Navels			Valencias			All varieties†			All-commodity index		
	Price per box	Relative price	Relative purchasing power	Price per box	Relative price	Relative purchasing power	Price per box	Relative price	Relative purchasing power	Nov.–May	April–Oct.	*
	1	2	3	4	5	6	7	8	9	10	11	12
1909–10	$1.56	100	95	$2.33	99	96	$1.74	99	95	105	103	104
1910–11	1.51	96	101	2.50	106	113	1.72	98	103	95	94	95
1911–12	1.48	94	96	2.34	99	97	1.64	93	94	98	102	99
1912–13	1.94	124	122	2.74	117	115	2.23	127	125	102	102	102
1913–14	1.35	86	86	1.86	79	79	1.47	83	83	100	100	100
1914–15	1.37	87	87	2.33	99	97	1.65	94	93	100	102	101
1915–16	1.66	106	91	2.85	121	95	2.08	118	101	117	128	117
1916–17	1.74	111	68	2.58	110	59	1.98	113	69	163	187	165
1917–18	3.82	244	129	3.92	167	84	3.88	220	115	189	200	192
1918–19	3.58	228	112	3.93	167	79	3.69	210	102	203	211	206
1919–20	3.90	249	105	4.32	184	77	4.10	233	99	237	239	236
1920–21	2.48	158	94	3.35	142	97	2.88	164	104	168	146	158
1921–22	3.91	249	173	4.64	197	128	4.24	241	162	144	154	149
1922–23	2.70	172	108	2.78	118	75	2.72	155	98	160	157	158
1923–24	2.12	135	88	3.24	138	91	2.61	148	97	153	151	152
1924–25	3.68	235	147	5.15	219	136	4.28	243	151	160	161	161
1925–26	3.56	227	145	3.56	151	99	3.55	202	130	157	153	155
1926–27	3.50	223	150	4.09	174	117	3.78	215	144	149	149	149

* Years 1909–10 to 1918–19, September to August. Years 1919–20 to 1926–27, November to October.

† Years 1911–12 to 1919–20 include grapefruit.

Sources of data:

Columns 1, 4, 7.—Compiled by the California Fruit Growers Exchange.

Columns 2, 5, 8.—Average 1909–10 to 1913–14=100.

Columns 3, 6, 9.—Relative prices deflated by the all-commodity index numbers.

Columns 10, 11, 12.—U. S. Bur. of Labor Statistics index number of all commodities converted to 1910–14 base published in The Agricultural Situation.

TABLE 26

Monthly Prices Received for Oranges F. O. B. California by the California Fruit Growers Exchange November 1922 to October 1927

Month	1922–23	1923–24	1924–25	1925–26	1926–27
	dollars per box	*dollars per box*	*dollars per box*	*dollars per box*	*dollars per box*
November	2.40	3.69	3.80	5.83	4.80
December	2.91	2.23	2.90	3.32	3.70
January	2.39	1.94	3.33	3.14	3.49
February	2.76	2.07	3.31	3.37	3.61
March	2.50	1.96	2.83	3.43	3.29
April	2.82	2.41	4.12	3.94	3.26
May	2.68	1.98	4.74	3.04	2.99
June	2.71	2.80	5.38	2.94	3.34
July	2.65	2.50	4.79	3.50	3.98
August	2.19	3.52	4.79	3.21	4.50
September	3.03	3.74	5.74	3.78	5.01
October	3.26	3.89	6.18	4.88	5.34

Source of data: California Fruit Growers Exchange.

TABLE 27

Carlot Shipments of Oranges by Districts and Counties, California 1922–23 to 1926–27

Districts and counties	Crop Year (November to October)				
	1922–23	1923–24	1924–25	1925–26	1926–27*
	cars	*cars*	*cars*	*cars*	*cars*
Southern district:					
Los Angeles	14,970	9,968	9,553	9,356	13,195
Orange	9,884	10,448	6,360	12,577	13,542
Riverside	4,388	5,193	2,922	4,853	6,329
San Bernardino	9,988	10,108	6,094	9,928	10,225
San Diego	264	228	200	252	300
Ventura	1,167	1,324	1,262	1,442	1,778
Others	9	.....	10	29	5
Total southern district	*40,670*	*37,269*	*26,401*	*38,437*	*45,374*
Central district	7,350	7,009	7,554	8,226	7,702
Northern district	321	627	483	354	498
Total California	*48,341*	*44,905*	*34,438*	*47,017*	*53,574*

* Subject to revision.

Sources of data:

Years 1922–23 to 1925–26. U. S. Dept. Agr. Bur. Agr. Econ. Unpublished data (revised).

Year 1926–27 from Yeoman, Opal V. Summary of carlot shipments of important fruits and vegetables in California, Arizona and Nevada, 1927. U. S. Dept. Agr. Bur. Agr. Econ. mimeographed circular, 1928.

STATION PUBLICATIONS AVAILABLE FOR FREE DISTRIBUTION

BULLETINS

No.

253. Irrigation and Soil Conditions in the Sierra Nevada Foothills, California.
262. Citrus Diseases of Florida and Cuba Compared with those of California.
263. Size Grades for Ripe Olives.
268. Growing and Grafting Olive Seedlings.
277. Sudan Grass.
278. Grain Sorghums.
279. Irrigation of Rice in California.
283. The Olive Insects of California.
304. A Study of the Effects of Freezes on Citrus in California.
310. Plum Pollination.
313. Pruning Young Deciduous Fruit Trees.
324. Storage of Perishable Fruits at Freezing Temperatures.
328. Prune Growing in California.
331. Phylloxera-resistant Stocks.
335. Cocoanut Meal as a Feed for Dairy Cows and Other Livestock.
340. Control of the Pocket Gopher in California.
343. Cheese Pests and Their Control.
344. Cold Storage as an Aid to the Marketing of Plums, a Progress Report.
347. The Control of Red Spiders in Deciduous Orchards.
348. Pruning Young Olive Trees.
349. A Study of Sidedraft and Tractor Hitches.
350. Agriculture in Cut-Over Redwood Lands.
353. Bovine Infectious Abortion, and Associated Diseases of Cattle and Newborn Calves.
354. Results of Rice Experiments in 1922.
357. A Self-Mixing Dusting Machine for Applying Dry Insecticides and Fungicides.
358. Black Measles, Water Berries, and Related Vine Troubles.
361. Preliminary Yield Tables for Second-Growth Redwood.
362. Dust and the Tractor Engine.
363. The Pruning of Citrus Trees in California.
364. Fungicidal Dusts for the Control of Bunt.
366. Turkish Tobacco Culture, Curing, and Marketing.
367. Methods of Harvesting and Irrigation in Relation to Moldy Walnuts.
368. Bacterial Decomposition of Olives During Pickling.
369. Comparison of Woods for Butter Boxes.
370. Factors Influencing the Development of Internal Browning of the Yellow Newton Apple.
371. The Relative Cost of Yarding Small and Large Timber.
373. Pear Pollination.
374. A Survey of Orchard Practices in the Citrus Industry of Southern California.
375. Results of Rice Experiments at Cortena, 1923, and Progress in Experiments in Water Grass Control at the Biggs Rice Field Station, 1922–23.
377. The Cold Storage of Pears.
380. Growth of Eucalyptus in California Plantations.
382. Pumping for Drainінge in the San Joaquin Valley, California.
385. Pollination of the Sweet Cherry.
386. Pruning Bearing Deciduous Fruit Trees.
387. Fig Smut.
388. The Principles and Practice of Sun-Drying Fruit.
389. Berseem or Egyptian Clover.
390. Harvesting and Packing Grapes in California.
391. Machines for Coating Seed Wheat with Copper Carbonate Dust.
392. Fruit Juice Concentrates.
393. Crop Sequences at Davis.
394. I. Cereal Hay Production in California. II. Feeding Trials with Cereal Hays.
395. Bark Diseases of Citrus Trees in California.
396. The Mat Bean, Phaseolus Aconitifolius.
397. Manufacture of Roquefort Type Cheese from Goat's Milk.
398. Orchard Heating in California.
400. The Utilization of Surplus Plums.
402. The Codling Moth in Walnuts.
404. The Dehydration of Prunes.
405. Citrus Culture in Central California.
406. Stationary Spray Plants in California.
407. Yield, Stand, and Volume Tables for White Fir in the California Pine Region.
408. Alternaria Rot of Lemons.
409. The Digestibility of Certain Fruit By-Products as Determined for Ruminants. Part I. Dried Orange Pulp and Raisin Pulp.
410. Factors Influencing the Quality of Fresh Asparagus after it is Harvested.
411. Paradichlorobenzene as a Soil Fumigant.
412. A Study of the Relative Value of Certain Root Crops and Salmon Oil as Sources of Vitamin A for Poultry.
414. Planting and Thinning Distances for Deciduous Fruit Trees.
415. The Tractor on California Farms.
416. Culture of the Oriental Persimmon in California.
417. Poultry Feeding: Principles and Practice.
418. A Study of Various Rations for Finishing Range Calves as Baby Beeves.
419. Economic Aspects of the Cantaloupe Industry.
420. Rice and Rice By-Products as Feeds for Fattening Swine.
421. Beef Cattle Feeding Trials, 1921–24.
422. Cost of Producing Almonds in California: a Progress Report.
423. Apricots (Series on California Crops and Prices).
424. The Relation of Rate of Maturity to Egg Production.
425. Apple Growing in California.
426. Apple Pollination Studies in California.
427. The Value of Orange Pulp for Milk Production.
428. The Relation of Maturity of California Plums to Shipping and Dessert Quality.
429. Economic Status of the Grape Industry.
430. Range Grasses of California.
431. Raisin By-Products and Bean Screenings as Feeds for Fattening Lambs.
432. Some Economic Problems Involved in the Pooling of Fruit.
433. Power Requirements of Electrically Driven Manufacturing Equipment.
434. Investigations on the Use of Fruits in Ice Cream and Ices.
435. The Problem of Securing Closer Relationship Between Agricultural Development and Irrigation Construction.

BULLETINS—(*Continued*)

No.

436. I. The Kadota Fig. II. Kadota Fig Products.
437. Economic Aspects of the Dairy Industry.
438. Grafting Affinities with Special Reference to Plums.
439. The Digestibility of Certain Fruit By-Products as Determined for Ruminants. Part II. Dried Pineapple Pulp, Dried Lemon Pulp, and Dried Olive Pulp.
440. The Feeding Value of Raisins and Dairy By-Products for Growing and Fattening Swine.
441. The Electric Brooder.
442. Laboratory Tests of Orchard Heaters.
443. Standardization and Improvement of California Butter.
444. Series on California Crops and Prices: Beans.
445. Economic Aspects of the Apple Industry.
446. The Asparagus Industry in California.
447. The Method of Determining the Clean Weights of Individual Fleeces of Wool.
448. Farmers' Purchase Agreement for Deep Well Pumps.
449. Economic Aspects of the Watermelon Industry.
450. Irrigation Investigations with Field Crops at Davis, and at Delhi, California.
451. Studies Preliminary to the Establishment of a Series of Fertilizer Trials in a Bearing Citrus Grove.
452. Economic Aspects of the Pear Industry.

CIRCULARS

No.

87. Alfalfa.
117. The selection and Cost of a Small Pumping Plant.
127. House Fumigation.
129. The control of Citrus Insects.
136. Melilotus Indica as a Green-Manure Crop for California.
144. Oidium or Powdery Mildew of the Vine.
157. Control of Pear Scab.
164. Small Fruit Culture in California.
166. The County Farm Bureau.
178. The Packing of Apples in California.
202. County Organization for Rural Fire Control.
203. Peat as a Manure Substitute.
209. The Function of the Farm Bureau.
212. Salvaging Rain-Damaged Prunes.
215. Feeding Dairy Cows in California.
230. Testing Milk, Cream, and Skim Milk for Butterfat.
231. The Home Vineyard.
232. Harvesting and Handling California Cherries for Eastern Shipment.
234. Winter Injury to Young Walnut Trees During 1921–1922.
238. The Apricot in California.
239. Harvesting and Handling Apricots and Plums for Eastern Shipment.
240. Harvesting and Handling California Pears for Eastern Shipment.
241. Harvesting and Handling California Peaches for Eastern Shipment.
243. Marmalade Juice and Jelly Juice from Citrus Fruits.
244. Central Wire Bracing for Fruit Trees.
245. Vine Pruning Systems.
248. Some Common Errors in Vine Pruning and Their Remedies.
249. Replacing Missing Vines.
250. Measurement of Irrigation Water on the Farm.
252. Support for Vines.
253. Vineyard Plans.
255. Leguminous Plants as Organic Fertilizers in California Agriculture.
257. The Small-Seeded Horse Bean (Vicia faba var. minor).
258. Thinning Deciduous Fruits.
259. Pear By-Products.
261. Sewing Grain Sacks.
265. Plant Disease and Pest Control.
266. Analyzing the Citrus Orchard by Means of Simple Tree Records.
267. The Tendency of Tractors to Rise in Front; Causes and Remedies.
269. An Orchard Brush Burner.
270. A Farm Septic Tank.
273. Saving the Gophered Citrus Tree.
276. Home Canning.
277. Head, Cane and Cordon Pruning of Vines.
278. Olive Pickling in Mediterranean Countries.
279. The Preparation and Refining of Olive Oil in Southern Europe.
281. The Results of a Survey to Determine the Cost of Producing Beef in California.
282. Prevention of Insect Attack on Stored Grain.
284. The Almond in California.
286. Milk Houses for California Dairies.
287. Potato Production in California.
288. Phylloxera Resistant Vineyards.
289. Oak Fungus in Orchard Trees.
290. The Tangier Pea.
292. Alkali Soils.
293. The Basis of Grape Standardization.
294. Propagation of Deciduous Fruits.
296. Control of the California Ground Squirrel.
298. Possibilities and Limitations of Cooperative Marketing.
300. Coccidiosis of Chickens.
301. Buckeye Poisoning of the Honey Bee.
302. The Sugar Beet in California.
304. Drainage on the Farm.
305. Liming the Soil.
307. American Foulbrood and Its Control.
308. Cantaloupe Production in California.
309. Fruit Tree and Orchard Judging.
310. The Operation of the Bacteriological Laboratory for Dairy Plants.
311. The Improvement of Quality in Figs.
312. Principles Governing the Choice, Operation and Care of Small Irrigation Pumping Plants.

The publications listed above may be had by addressing

College of Agriculture,
University of California,
Berkeley, California.

25*m*-8,'28